KAISAI

INSTRUKCJA OBSŁUGI
urządzeń klimatyzacyjnych KAISAI

New Energy Requirement

SUPER DC INVERTER SERIES

Service Manual 2012

LFIS-B-1211

EuroClima

DO 5 LAT gwarancji*

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※The specifications, designs, and information in this book are subject to change without notice for product improvement.

Part 1
General Information

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Model Lists

1.1 Indoor Units

R410A (capacity multiplied by 1000Btu/h)

Type	Function	18	24	36
Super slim cassette	Cooling and heating	●	●	●
Duct	Cooling and heating	●	●	●
Ceiling-floor	Cooling and heating	●	●	●

1.2 Outdoor Units

Universal Outdoor unit Model	Compressor type	Compressor Brand	Matched indoor units
KOU-18HFN1-QRC4	Rotary	GMCC	KCD-18HRFN1-QRC4 KTB-18HWFN1-QRC4 KUE-18HRDN1-QRC4
KOU-24HFN1-QRC4	Rotary	GMCC	KCD-24HRFN1-QRC4 KTB-24HWDN1-QRC4 KUE-24HRDN1-QRC4
MOU-24HFN1-QRC8	Rotary	GMCC	KCD-24HRFN1-QRC8 KUE-24HRFN1-QRC8
MOU-36HFN1-QRC4	Scroll	Mitsubishi	KCD-36HRFN1-QRC4 KTB-36HWFN1-QRC4 KUE-36HRFN1-QRC4
MOU-36HFN1-RRC4	Scroll	Mitsubishi	KCD-36HRFN1-QRC4 KTB-36HWFN1-QRC4 KUE-36HRFN1-QRC4

External Appearance

1.2 Indoor Units

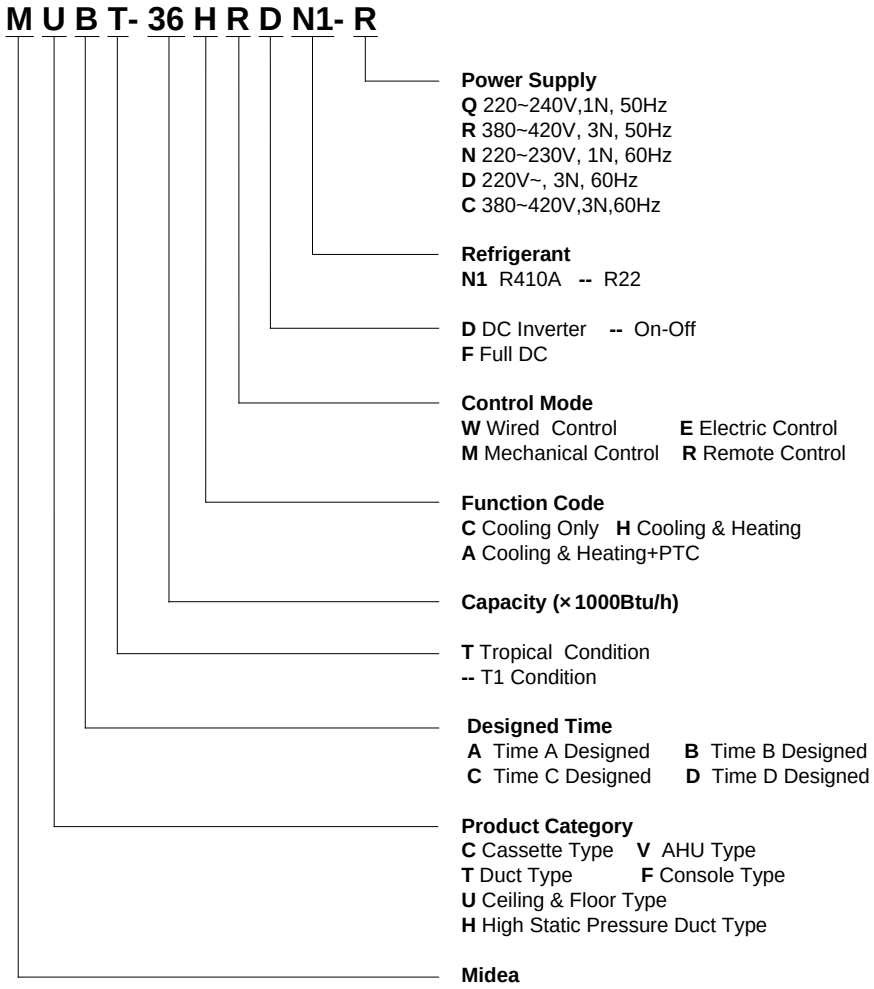
Super slim cassette	Duct
Ceiling-Floor	

2.2 Outdoor Units

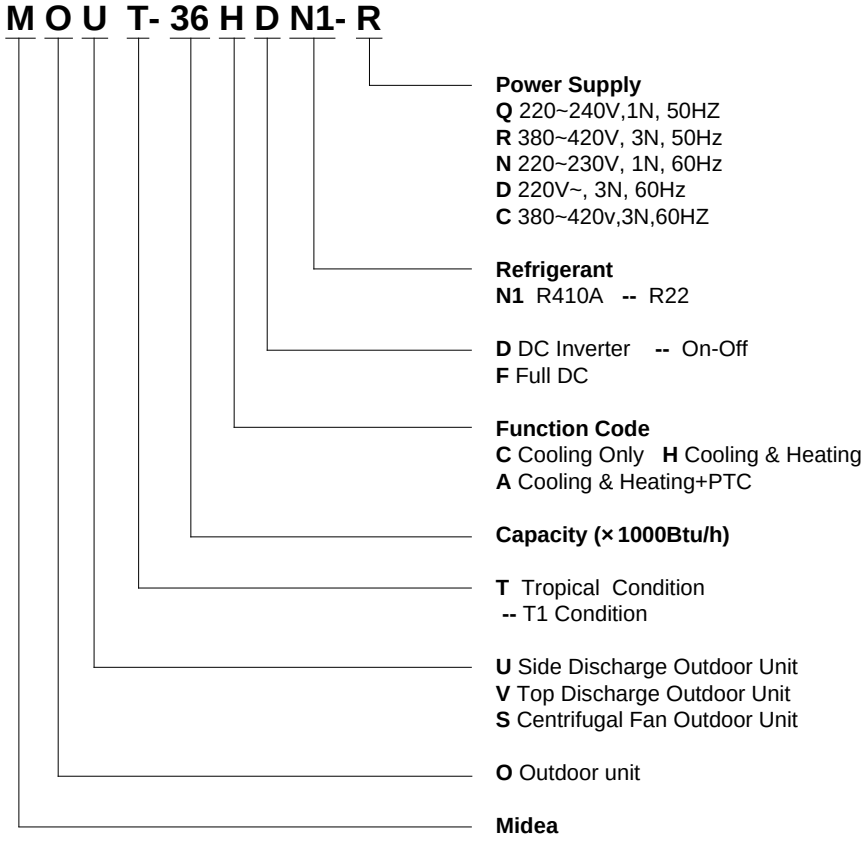
Single fan outdoor unit

Nomenclature

3.1 Indoor Unit


M U B T- 36 H R D N1- R
Power Supply
Q 220~240V,1N, 50Hz
R 380~420V, 3N, 50Hz
N 220~230V, 1N, 60Hz
D 220V~, 3N, 60Hz
C 380~420V,3N,60Hz
Refrigerant
N1 R410A -- R22
D DC Inverter -- On-Off
F Full DC
Control Mode
W Wired Control E Electric Control
M Mechanical Control R Remote Control
Function Code
C Cooling Only H Cooling & Heating
A Cooling & Heating+PTC
Capacity (×1000Btu/h)
T Tropical Condition
-- T1 Condition
Designed Time
A Time A Designed B Time B Designed
C Time C Designed D Time D Designed
Product Category
C Cassette Type V AHU Type
T Duct Type F Console Type
U Ceiling & Floor Type
H High Static Pressure Duct Type
Midea

3.2 Outdoor Unit



Features

4.1. To meet Europe A level, actual EER/COP of new product with BLDC motors of indoor & outdoor unit and DC compressor will be higher than 3.4.
4.2. Low ambient kit is standard for outdoor units
4.3. Network control function is standard for the indoor units.
4.4. Standard auto restart function and follow me function.
4.5. Slim cassette with standard remote controller, wire controller and CCM for optional. Med Duct and HESP duct with standard wired controller, remote controller and CCM for optional.
4.6. Standard anti-cold air function.
4.7. Standard auto defrosting function.
4.8. Standard self-diagnose function.
4.9. Standard timer function and sleep mode function controlled by controller.

Part 2
Indoor Units

Super Slim Cassette Type 7

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Super Slim Cassette Type

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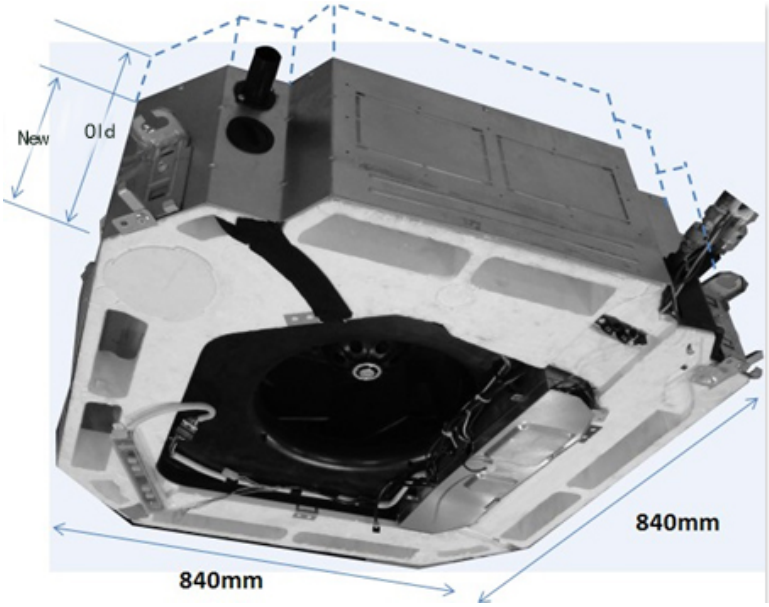
1. Features

1.1 Overview

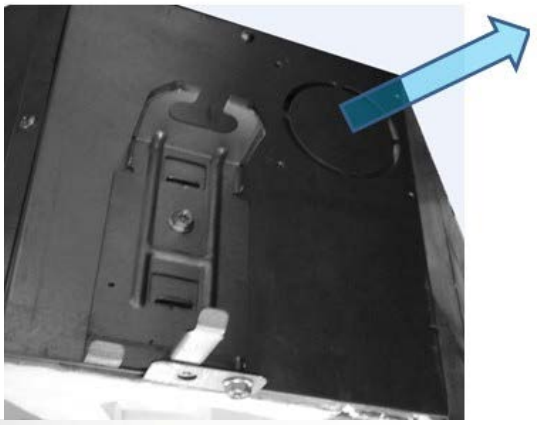
- Compact design, super slim body size, less space requiring in installation
- Each louver can be separately controlled, more comfort air blowing is possible.
- Auto-lifting panel design, more convenient to clean and maintain the filter.(optional)



	Old Cassette	New slim cassette	Volume change
Dimension	18K-24K： 840*230*840	18K-24K： 840*203*840	13.3%↓
	30K： 840*300*840	30K： 840*203*840	47.7%↓
	36K-48K： 840*300*840	36K-48K： 840*245*840	22.4%↓

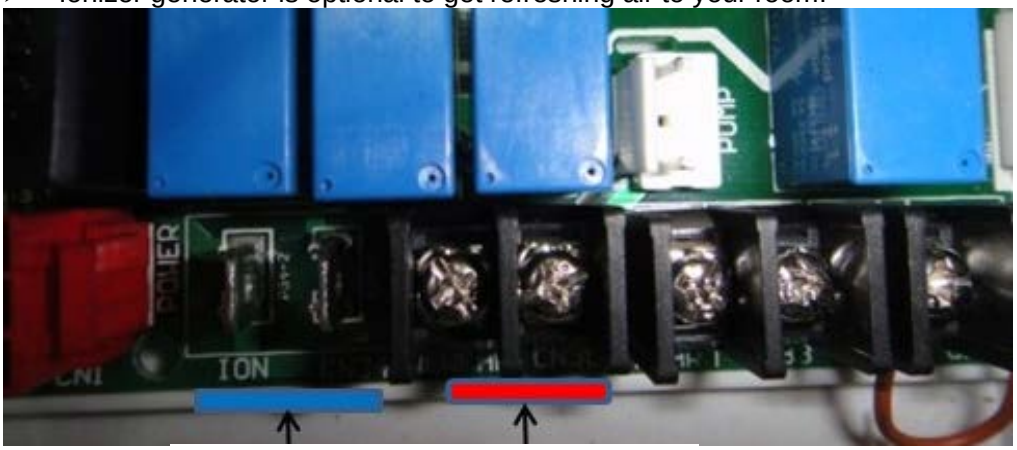
1.2 Fresh air intake function

- Fresh air fulfills air quality more healthy and comfortable.
- Ventilation motor is optional to increase the effect of fresh air.



1.3 Optional ionizer generator

- Ionizer generator is optional to get refreshing air to your room.

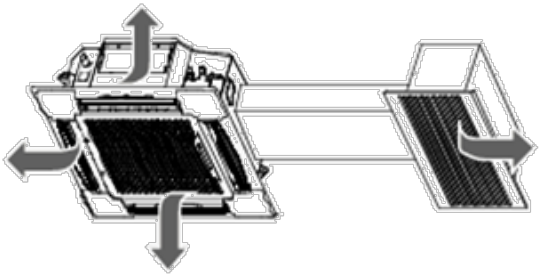


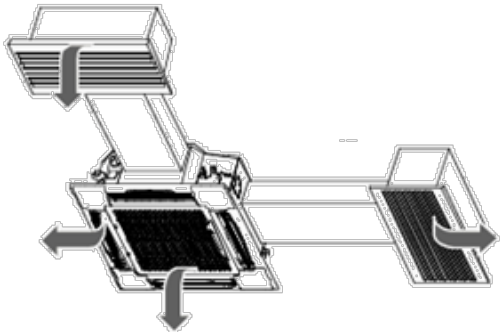
Ionizer generator connector Ventilation motor connector

- Ionizer can be switched on or off by remote controller.
  When pressing the Clean Air button on the remote controller, Ionizer will work and the indicator light on display board will shine.

1.4 External air duct design

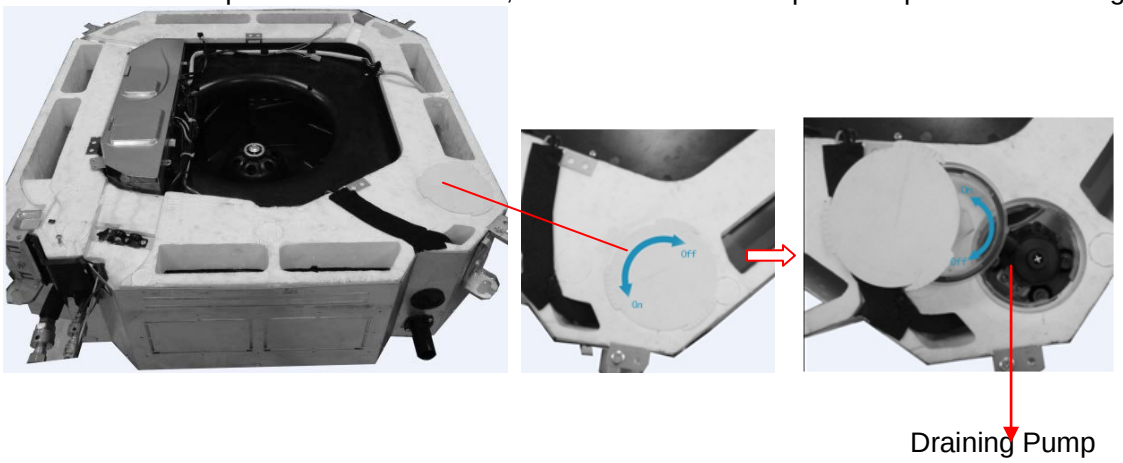
➢ Reserve external air duct, more flexible for the air supply.



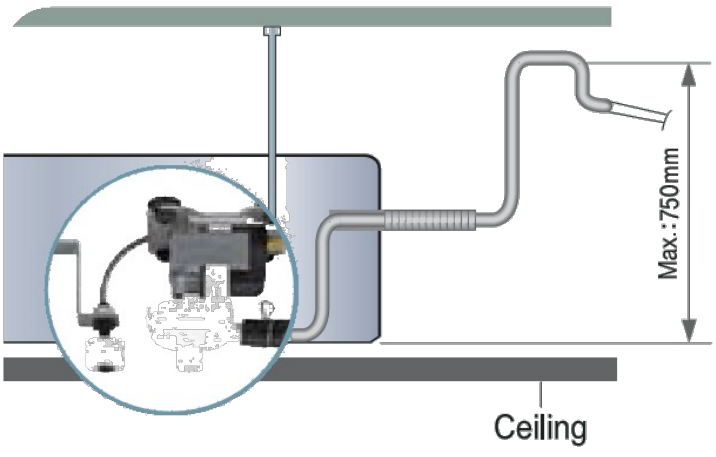


1.5 Built-in draining pump

➢ Due to the improvement of structure, more convenient to repair or replace the draining pump.

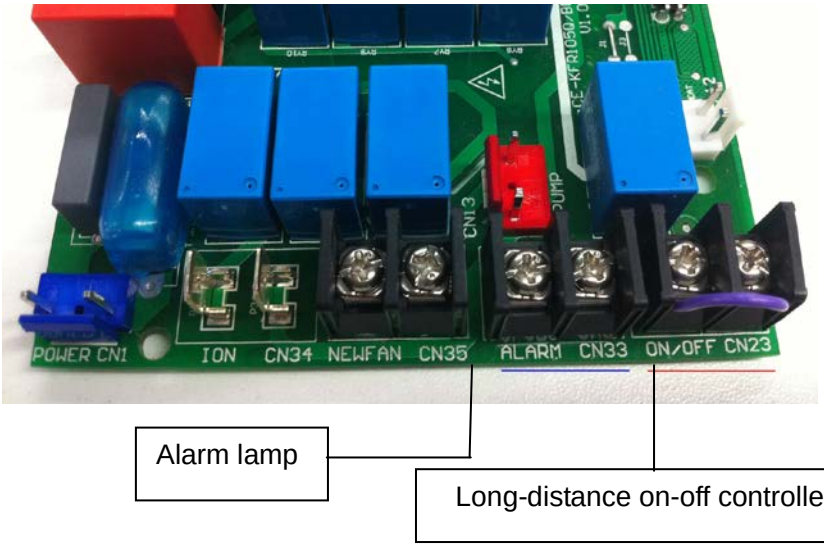


➢ Built-in draining pump to make sure condensed water drain out reliably.



1.6 Terminals for alarm lamp and long-distance on-off controller connection are standard

- Reserve terminals for the connection of alarm lamp and long-distance on-off controller, more human control.

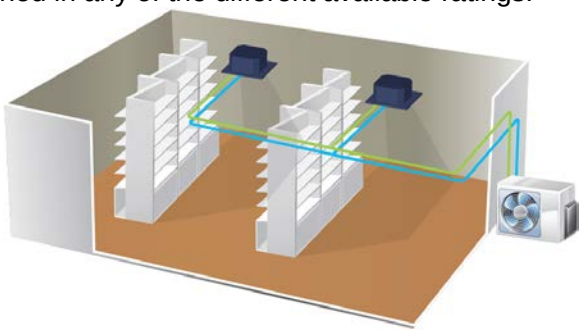


1.7 Standard touch screen wired controller

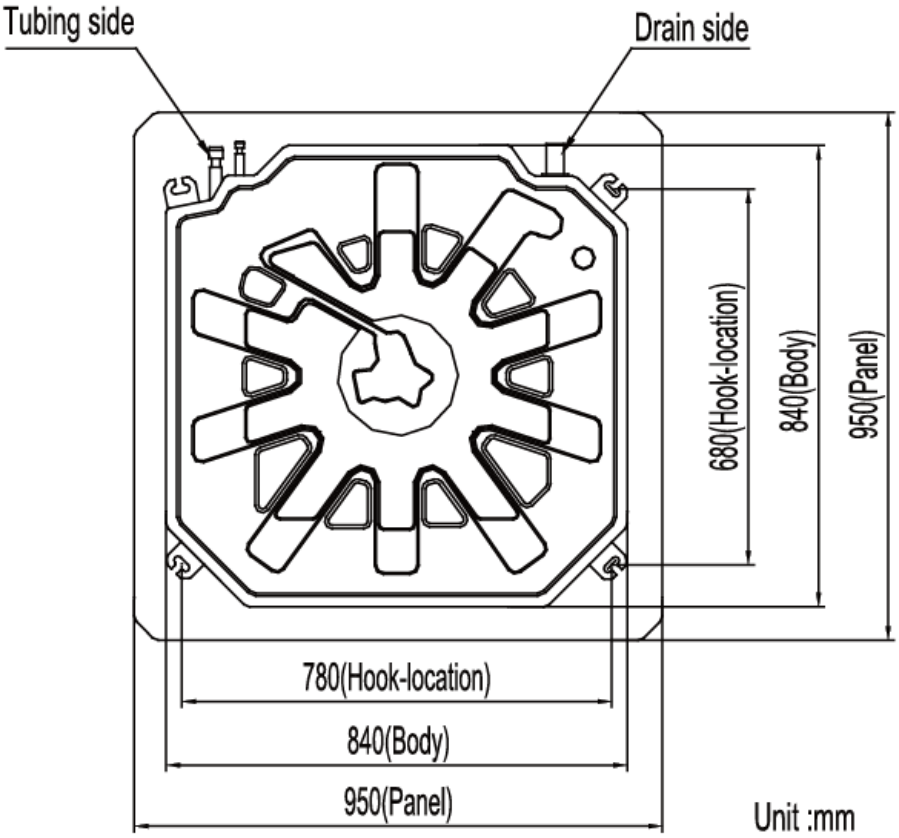
- Touch screen wired controller is standard, with error code indication function. Better man-machine conversation interface.
- Undated structure design, 4-way wire layout design, no raised part at backside, more convenient to place the wires and install the device.
- Remote controller is optional (without auto-lifting panel function).

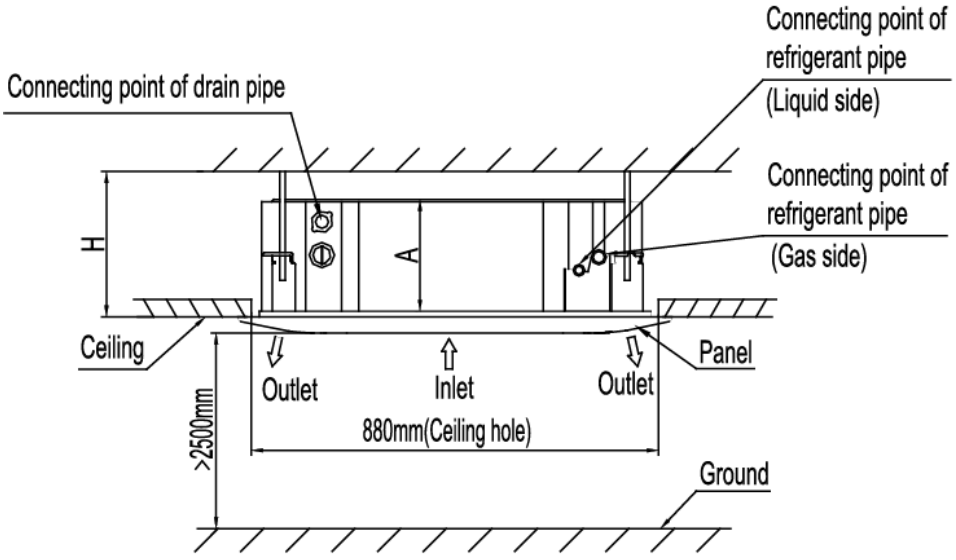
1.8 Twins Combination

- The units can be installed as Twin systems: one outdoor unit can connect with two indoor units. The indoor units can be combined in any of the different available ratings.



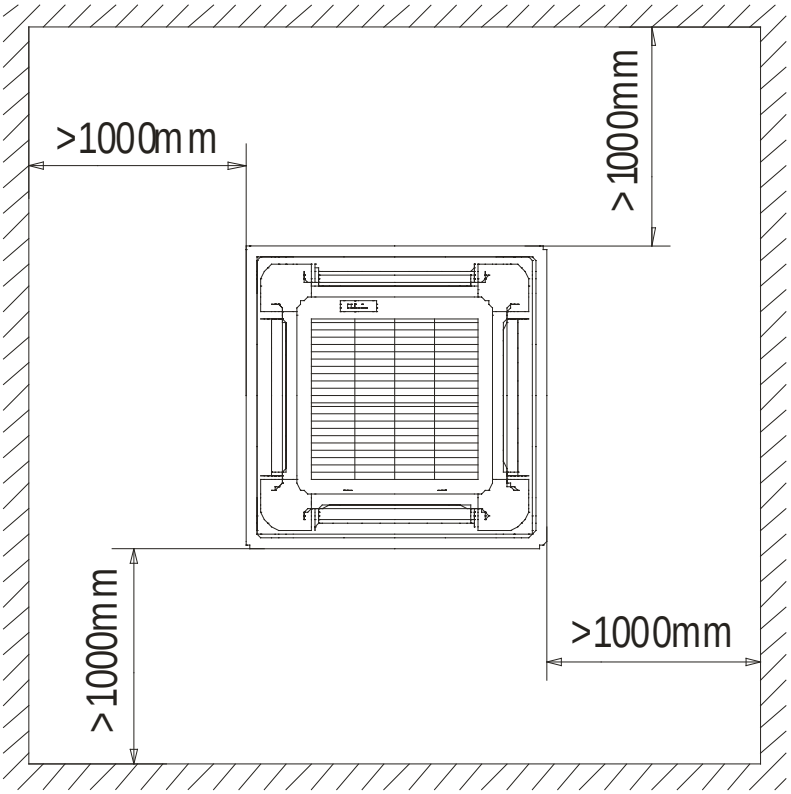
2. Dimensions





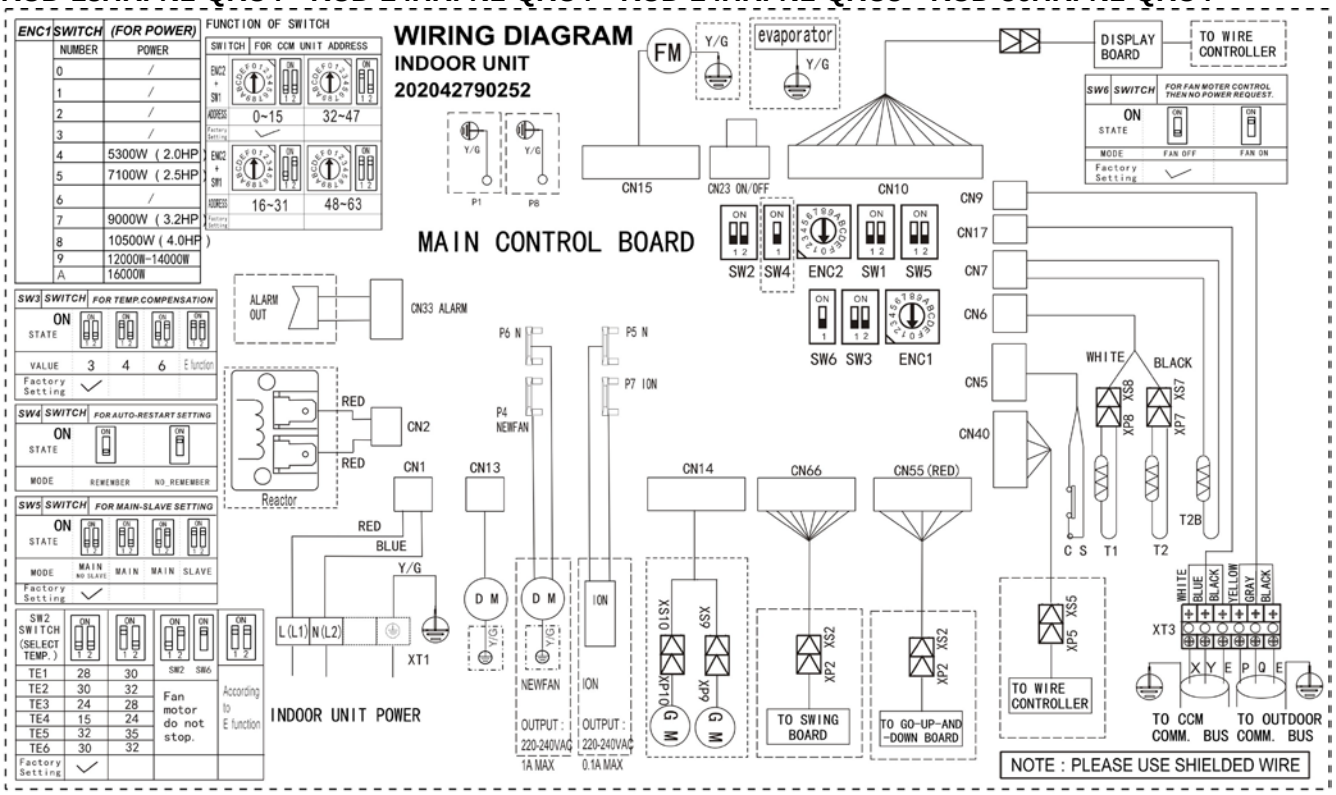
Model	A	H
18	205	>235
24	205	>235
36	245	>275

3. Service Space



4. Wiring Diagrams

KCD-18HRFN1-QRC4 KCD-24HRFN1-QRC4 KCD-24HRFN1-QRC8 KCD-36HRFN1-QRC4

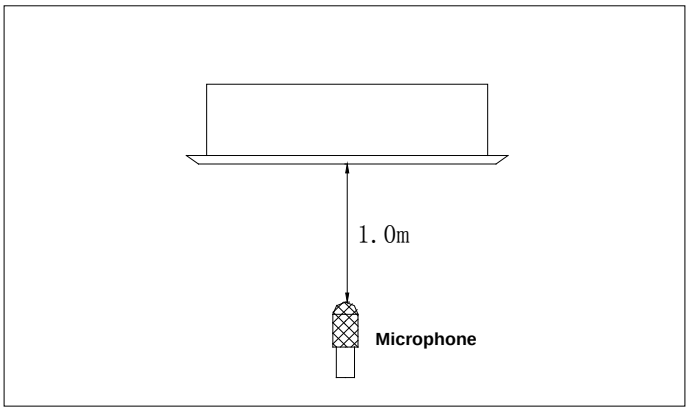


5. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min	Max	MFA
KCD-18HRFN1-QRC4	50	220-240	198	254	15
KCD-24HRFN1-QRC4	50	220-240	198	254	15
KCD-24HRFN1-QRC8	50	220-240	198	254	15
KCD-36HRFN1-QRC4	50	220-240	198	254	15

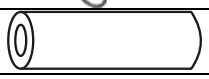
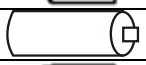
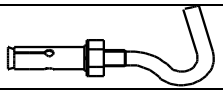
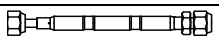
Notes:
MFA: Max. Fuse Amps. (A)

6. Sound Levels



Model	Noise Power dB(A)	Noise level dB(A)		
		H	M	L
KCD-18HRFN1-QRC4	58	47	43	36
KCD-24HRFN1-QRC4	59	48	44	40
KCD-24HRFN1-QRC8	64	48	44	40
KCD-36HRFN1-QRC4	65	54	50	48

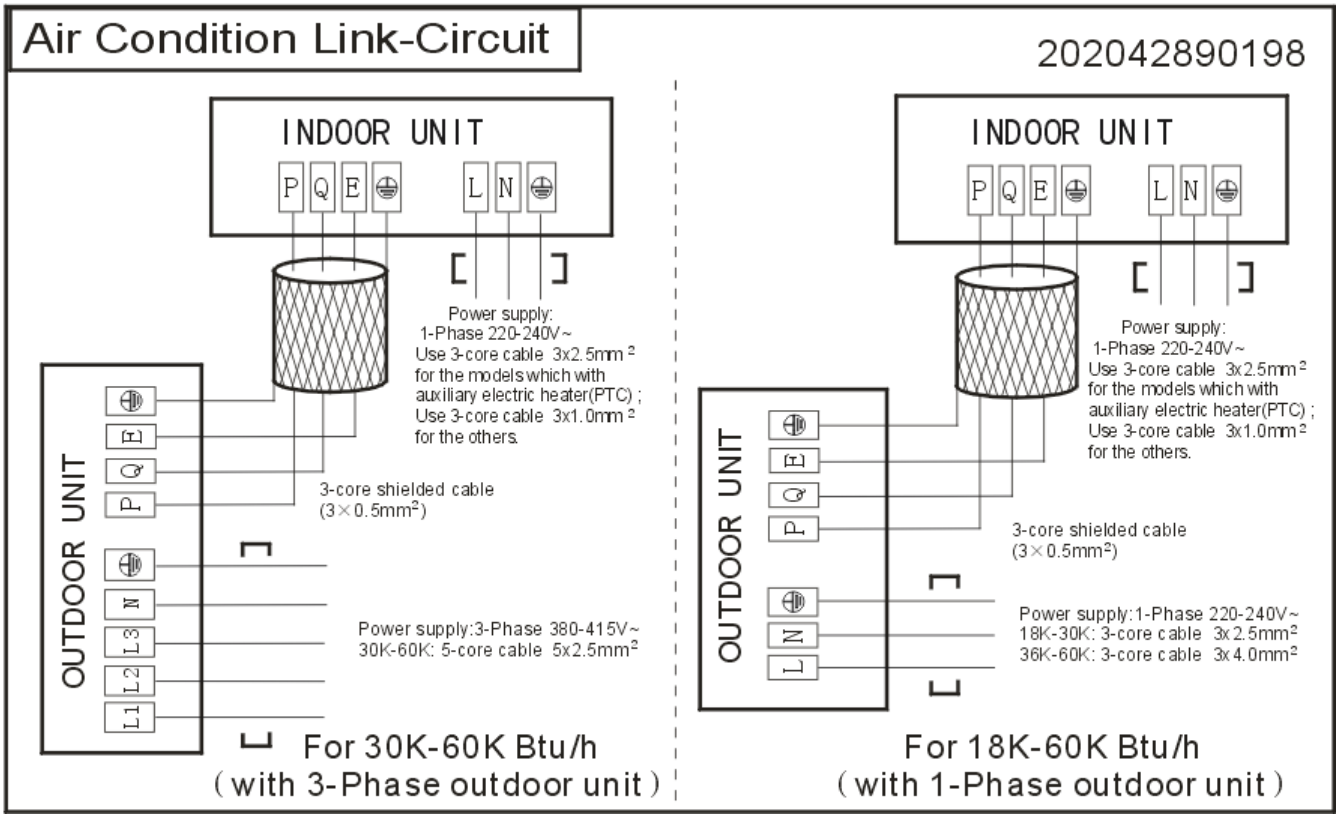
7. Accessories

	Name	Shape	Quantity
INSTALLATION FITTINGS	Installation paper board		1
	Bolt M5		4
Tubing & Fittings	Soundproof / insulation sheath		2
Drainpipe Fittings	Out-let pipe		1
	Out-let pipe sheath		1
	Out-let pipe clasp		1
Remote controller & Its Frame	Remote controller & Its Frame		1
	Remote controller holder		1
	Mounting screw(ST2.9×10-C-H)		2
	Remote controller manual		1
	Alkaline dry batteries (AM4)		2
Others	Owner's manual		1
	Installation manual		1
	Network wires		1
Installation accessory (The product you have might not be provided the following accessories	Expansible hook		4
	Installation hook		4
	Orifice		1

8. The Specification of Power

Model		18000-24000Btu/h	36000	36000 Btu/h
INDOOR UNIT POWER	Phase	1-phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm^2)	3×1.0	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	15	15	15
OUTDOOR UNIT POWER	Phase	1-phase	1-phase	3-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	380-420V, 50Hz
	POWER WIRING (mm^2)	3×2.5	3×4.0	5×2.5
	CIRCUIT BREAKER (A)	30	40	30
Indoor/Outdoor Connecting Wiring (Weak Electric Signal) (mm^2)		3×0.5	3×0.5	3×0.5
Indoor/Outdoor Connecting Wiring (Strong Electric Signal) (mm^2)		———	———	———

9. Field Wiring



Duct Type

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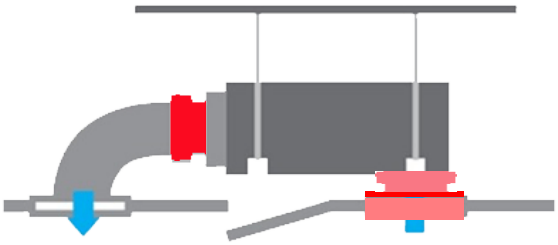
1. Features

1.1 Installation accessories: (Optional)

- Front Board, Canvas Air Passage, Filter, Panel, for easy installation

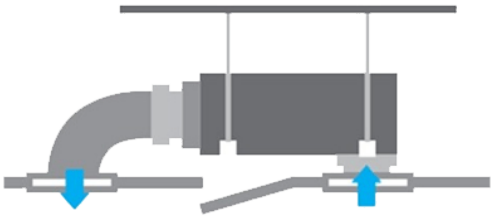


Panel

1.2 Easy Installation: Two air inlet styles (Bottom side or Rear side)

- Air inlet from rear is standard for all capacity; air inlet from bottom is optional.
- The size of air inlet frame from rear and bottom is same, it's very easy to move the cover from bottom to rear side, or from rear to the bottom, in order to matching the installation condition.

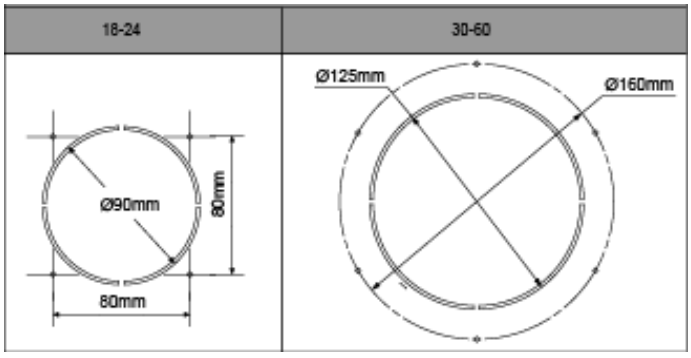
Air intake from rear (Standard)



Air intake from bottom (Optional)

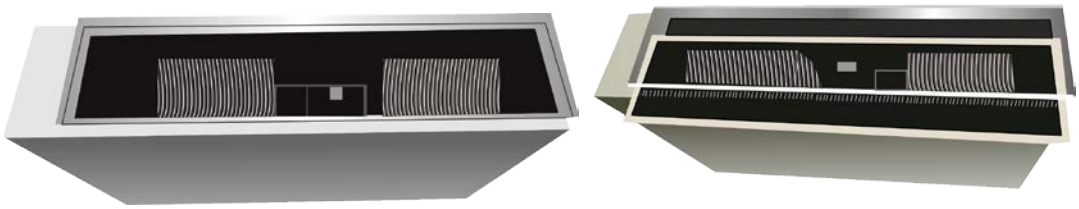
1.3 Fresh air intake function

- Install one duct from the reserved fresh-air intake to outdoor.
  Continually inhale the fresh air to improve the quality of the indoor air, fulfills air quality more healthy and comfortable.

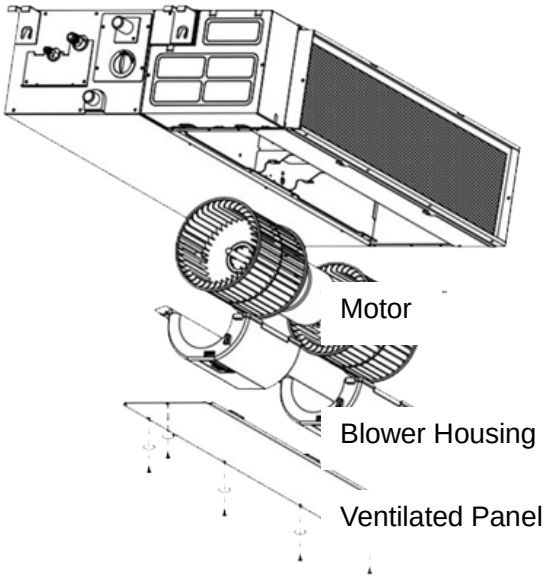


1.4 Easy maintenance

- Clean the filter (Optional, standard product without filter)
  It is easy to draw out the filter from the indoor unit for cleaning, even the filter is installed in rear side or bottom side.

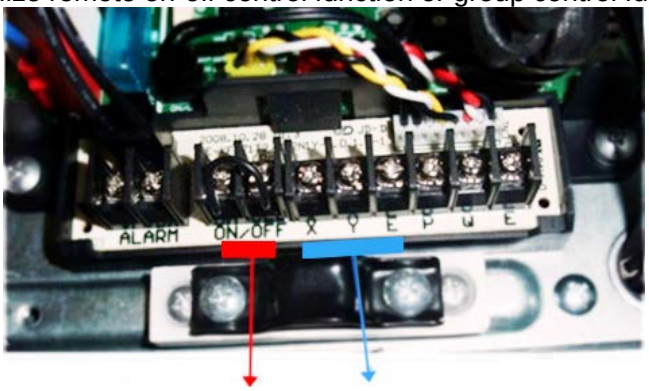


- Replace the motor or centrifugal fan
  Remove the ventilated panel firstly. Remove a half of blower housing and take out the motor with centrifugal fan. Directly remove two bolts, and then replace the motor or centrifugal fan easily.



1.5 Reserved remote on-off and central control ports

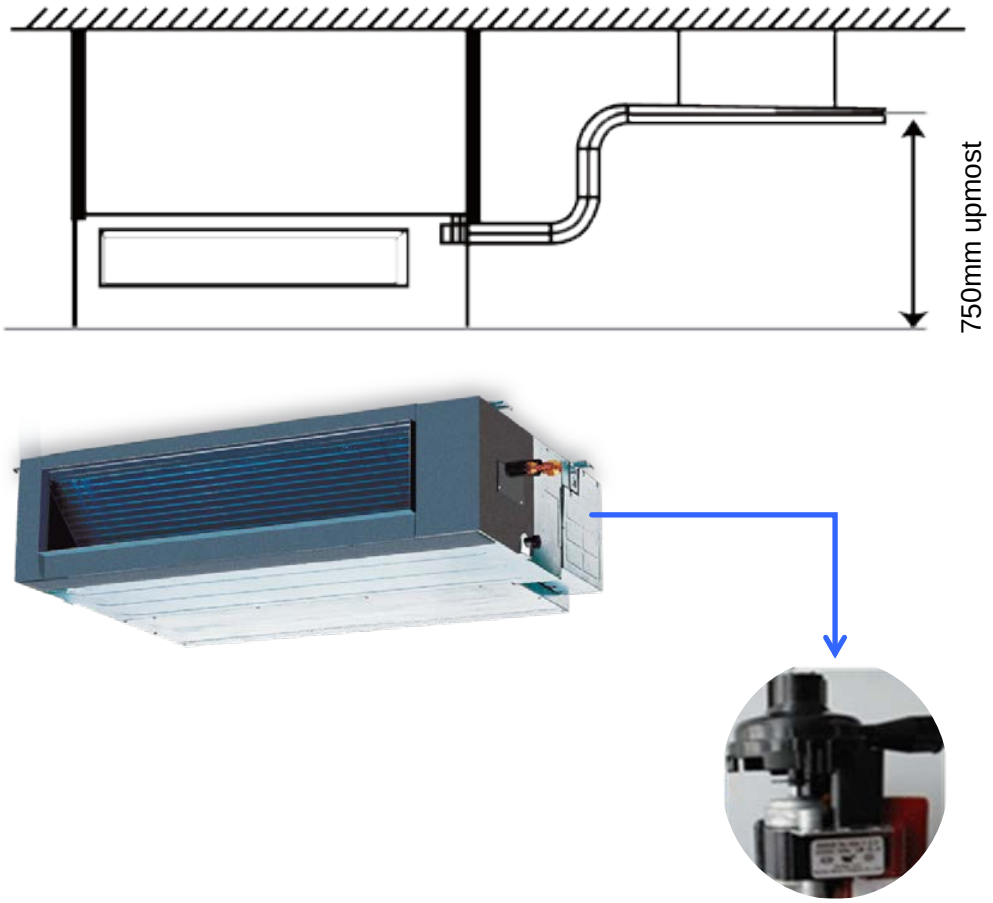
- Reserved remote on-off ports and central control ports, can connect the cable of an on-off controller or a central controller to realize remote on-off control function or group control function.



Remote on-off ports Central control ports

1.6 Built-in drain pump (Optional):

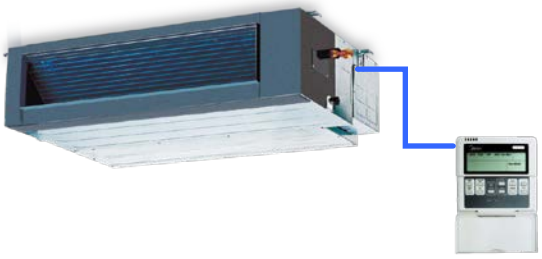
- Built-in drain pump can lift the water to 750mm upmost. It's convenient to install drainage piping under most space condition.



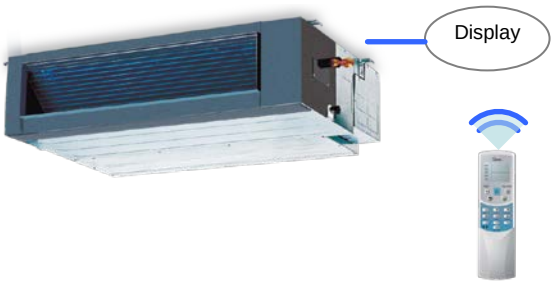
1.7 Built-in display board

- The standard indoor unit can be controlled by wired controller.
- There is a display board with a receiver in the E-box. Move out the display, and fix it in other place, even in the distance of 10m. The unit will realized remoter control.
- The wired controller and the display board can display the error code or production code when the chips detect some failure.

Wired Controller (Standard)

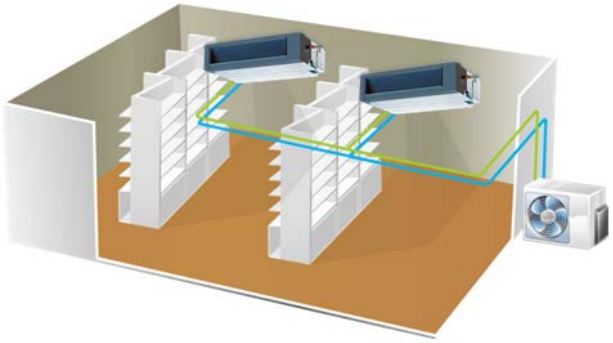


Remote Controller (Optional)

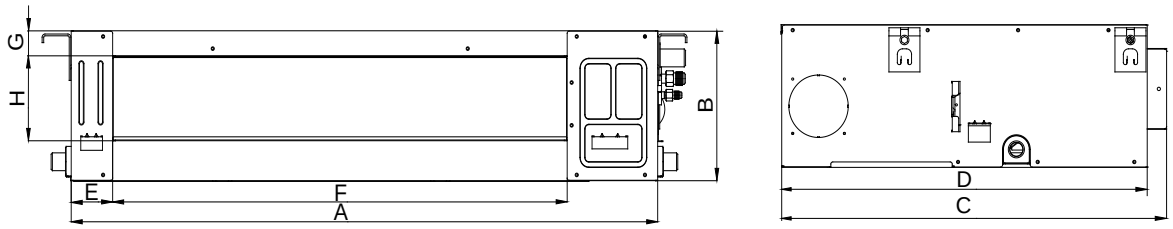


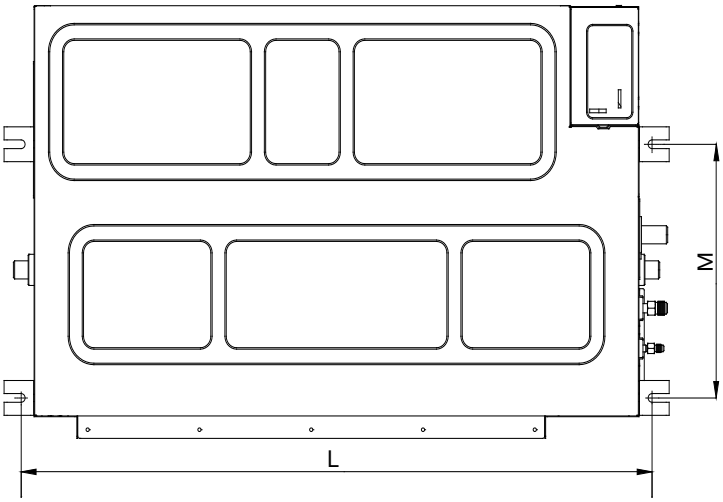
1.8 Twins Combination

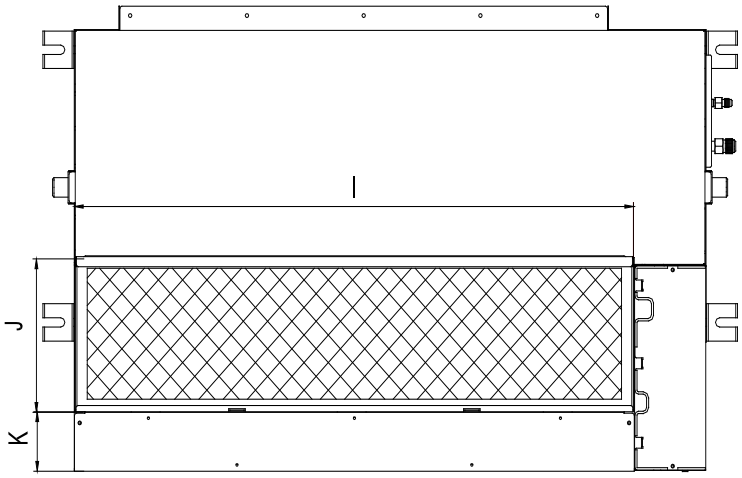
- The units can be installed as Twin systems: one outdoor unit can connect with two indoor units. The indoor units can be combined in any of the different available ratings.



2. Dimensions



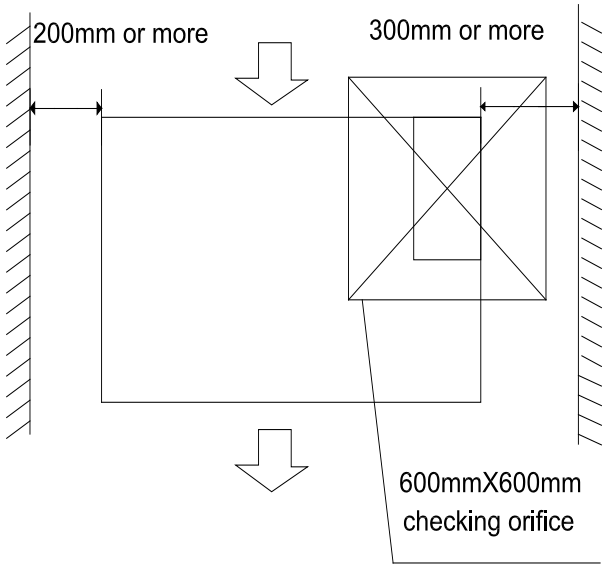




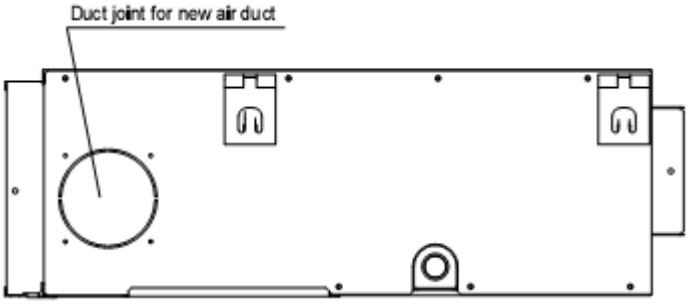
Capacity (KBtu)	Outline dimension(mm)				Air outlet opening size				Air return opening size			Size of outline dimension mounted plug	
	A	B	C	D	E	F	G	H	I	J	K	L	M
18/24	920	270	635	570	65	713	35	179	815	260	20	960	350
30/36	1140	270	775	710	65	933	35	179	1035	260	20	1180	490

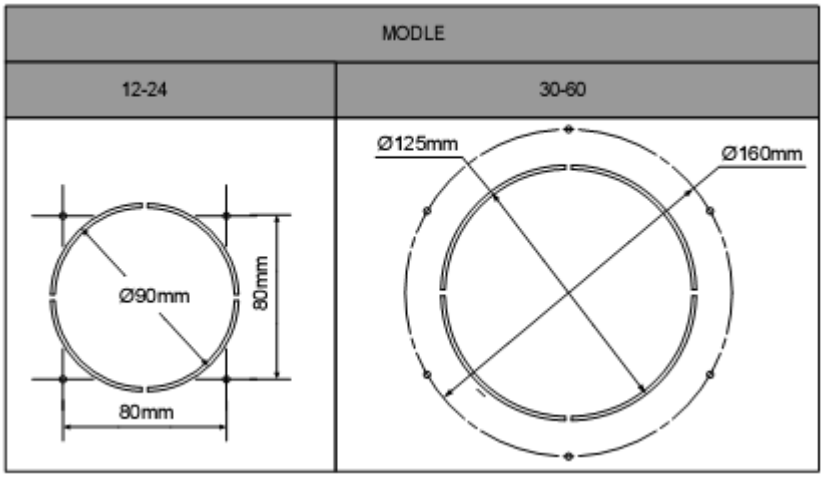
3. Service Space

Ensure enough space required for installation and maintenance.



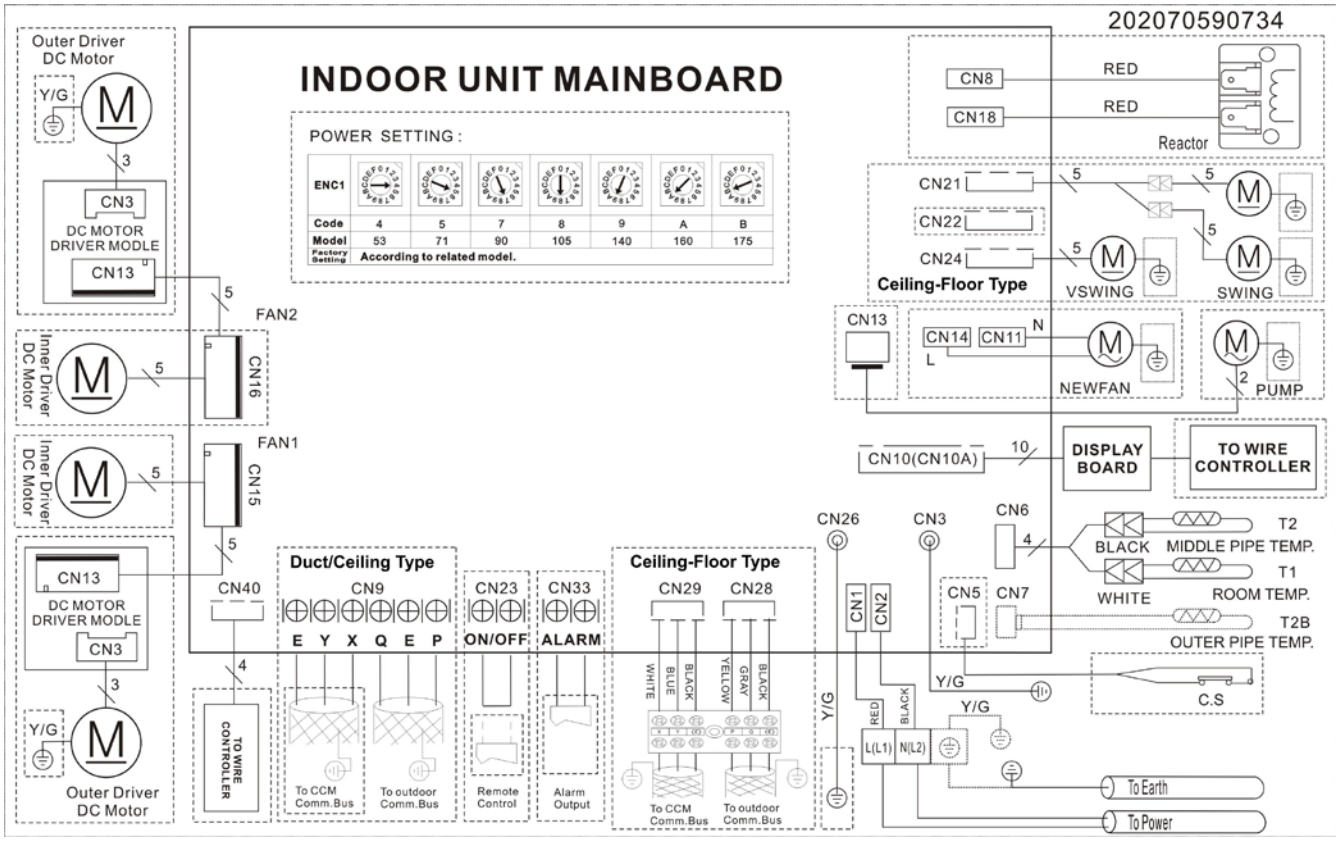
All the indoor units reserve the hole to joint the fresh air pipe. The hole size as following:

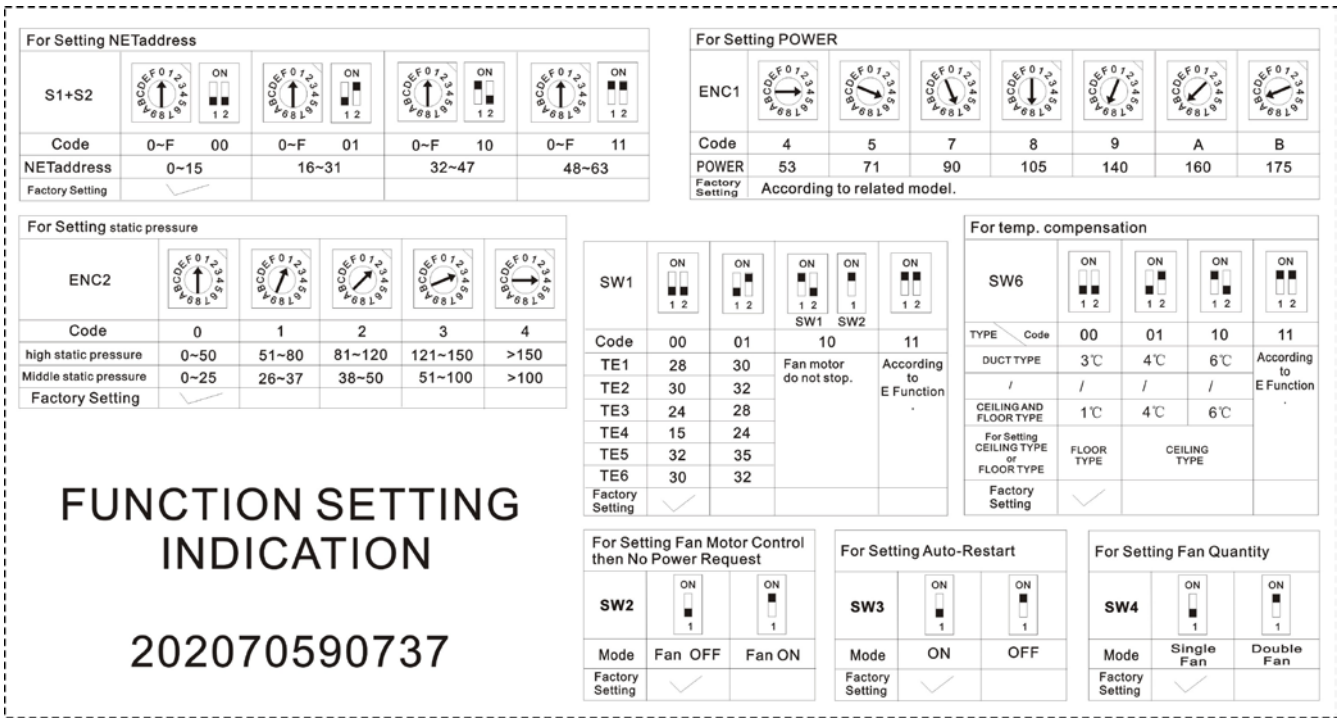




4. Wiring Diagrams

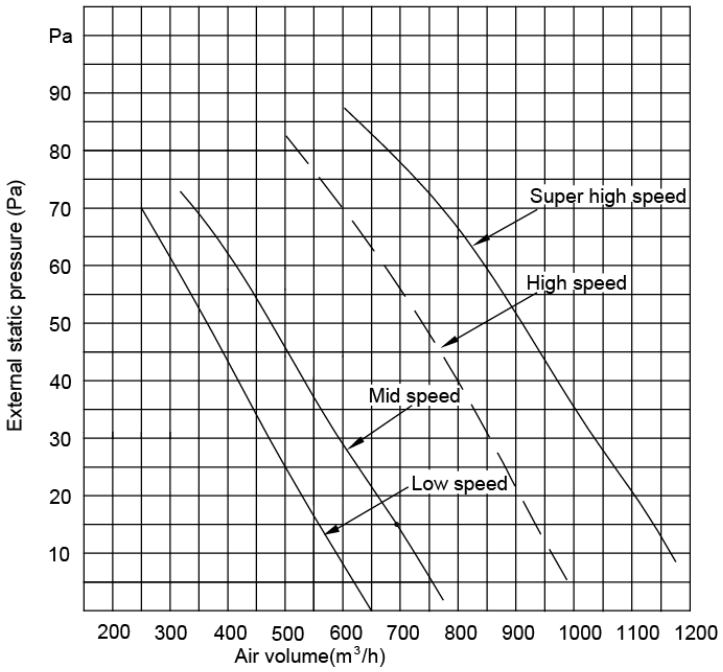
KTB-18HWFN1-QRC4 KTB-24HWDN1-QRC4 KTB-36HWFN1-QRC4



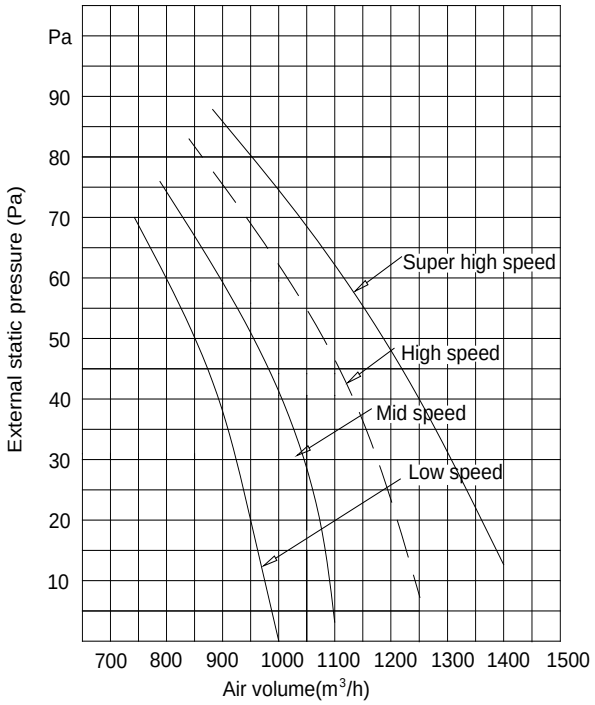


5. Static Pressure

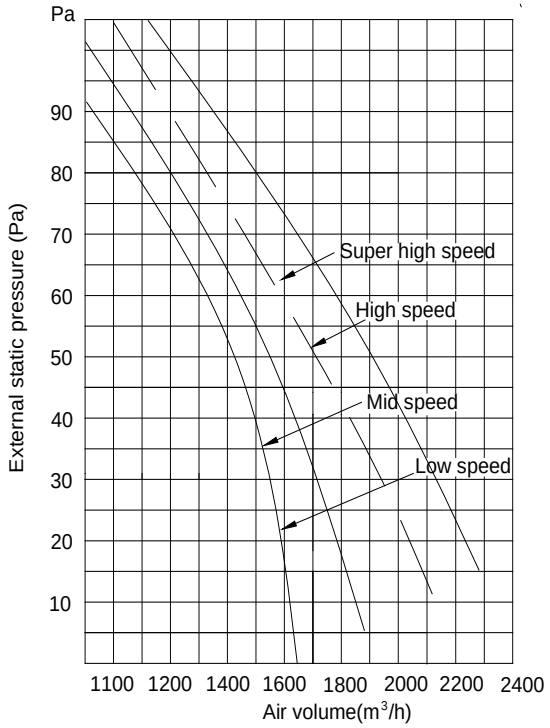
18,000Btu/h



24,000Btu/h



36,000Btu/h

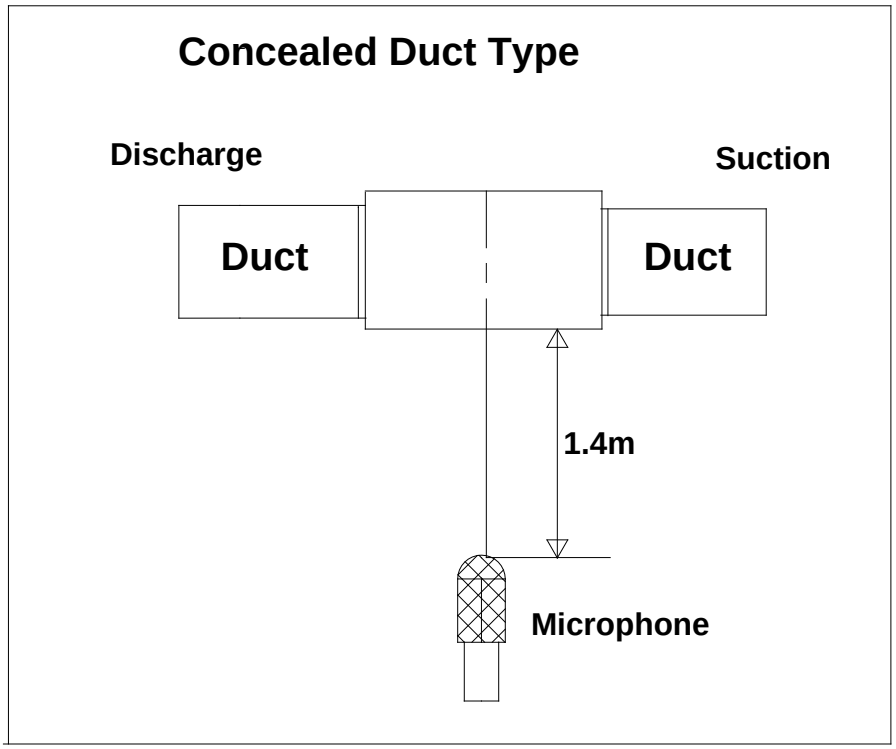


6. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min.	Max.	MFA
KTB-18HWFN1-QRC4	50	220-240	198	254	15
KTB-24HWDN1-QRC4	50	220-240	198	254	15
KTB-36HWFN1-QRC4	50	220-240	198	254	15

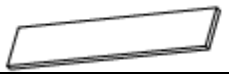
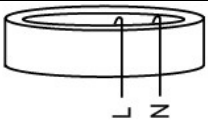
Note:
MFA: Max. Fuse Amps. (A)

7. Sound Levels



Model	Sound Power dB(A)	Noise level dB(A)		
		H	M	L
KTB-18HWFN1-QRC4	59	40	38	36
KTB-24HWDN1-QRC4	58	43	37	34
KTB-36HWFN1-QRC4	64	48	44	40

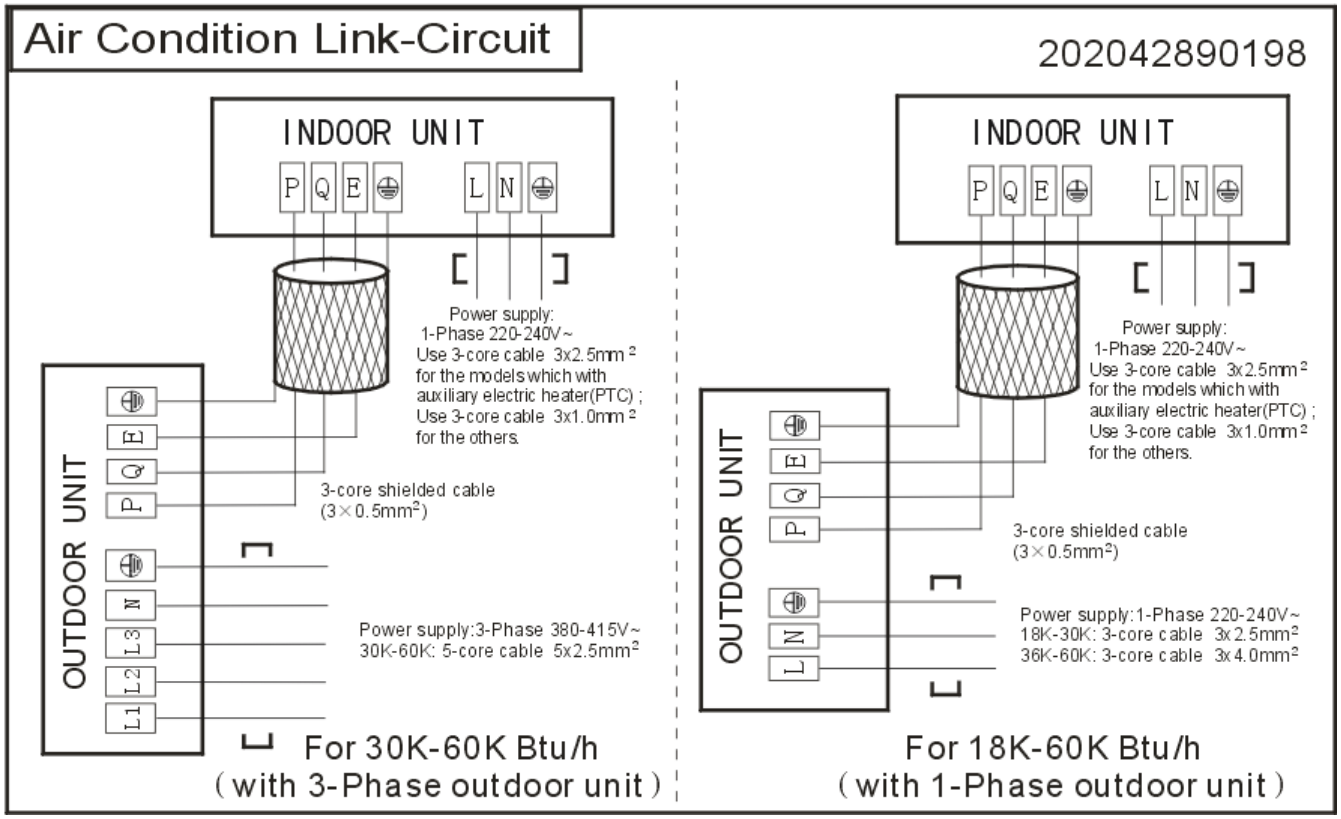
8. Accessories

	Name	Shape	Quantity
Tubing & Fittings	Soundproof / insulation sheath		2
	Binding tape		1
	Seal sponge		1
Drainpipe Fittings (for cooling & heating)	Drain joint		1
	Seal ring		1
Wired controller & Its Frame	Wired controller		1
Others	Owner' s manual		1
	Installation manual		1
EMS & It's fitting	Magnetic ring (twist the electric wires L and N around it to five circles)		1

9. The Specification of Power

Model		18000-24000Btu/h	36000	36000 Btu/h
INDOOR UNIT POWER	Phase	1-phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm^2)	3×1.0	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	15	15	15
OUTDOOR UNIT POWER	Phase	1-phase	1-phase	3-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	380-420V, 50Hz
	POWER WIRING (mm^2)	3×2.5	3×4.0	5×2.5
	CIRCUIT BREAKER (A)	30	40	30
Indoor/Outdoor Connecting Wiring (Weak Electric Signal) (mm^2)		3×0.5	3×0.5	3×0.5
Indoor/Outdoor Connecting Wiring (Strong Electric Signal) (mm^2)		———	———	———

10. Field Wiring



Ceiling & Floor Type

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7. Accessories 39

8. The Specification of Power 39

9. Field Wiring 40

1. Features

1.1. New design, more modern and elegant appearance.

1.2.

1.2. Convenient installation

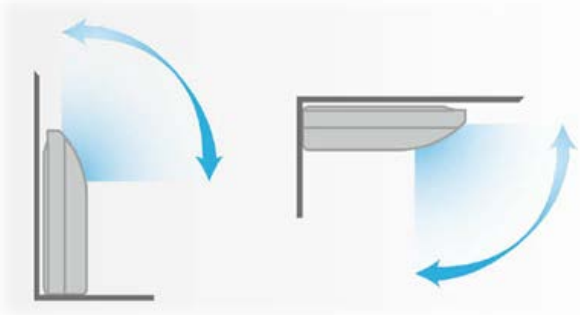
--The ceiling type can be easily installed into a corner of the ceiling even if the ceiling is very narrow

--It is especially useful when installation of an air conditioner in the center of the ceiling is impossible due to a structure such as one lighting.

1.3. Two direction auto swing (vertical & horizontal) and wide angle air flow,

--Air flow directional control minimizes the air resistance and produces wilder air flow to vertical direction.

--The range of horizontal air discharge is widened which secures wider air flow distribution to provide more comfortable air circulation no matter where the unit is set up



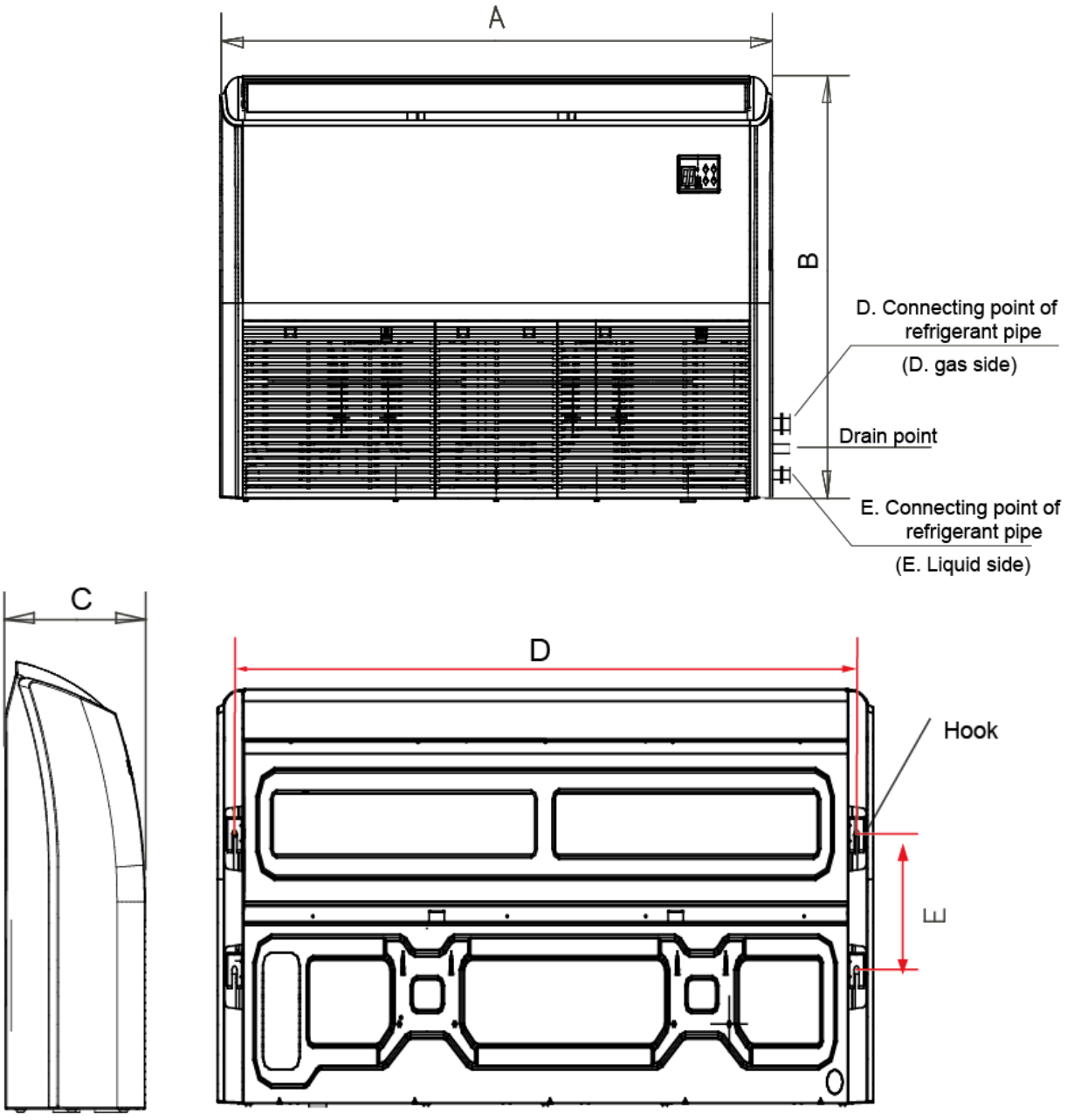
1.4. Three level fan speed, more humanism design, meets different air-supply requirement.

1.5. New foam drain pan with plastic-spraying inner surface

1.6. Easy operation.

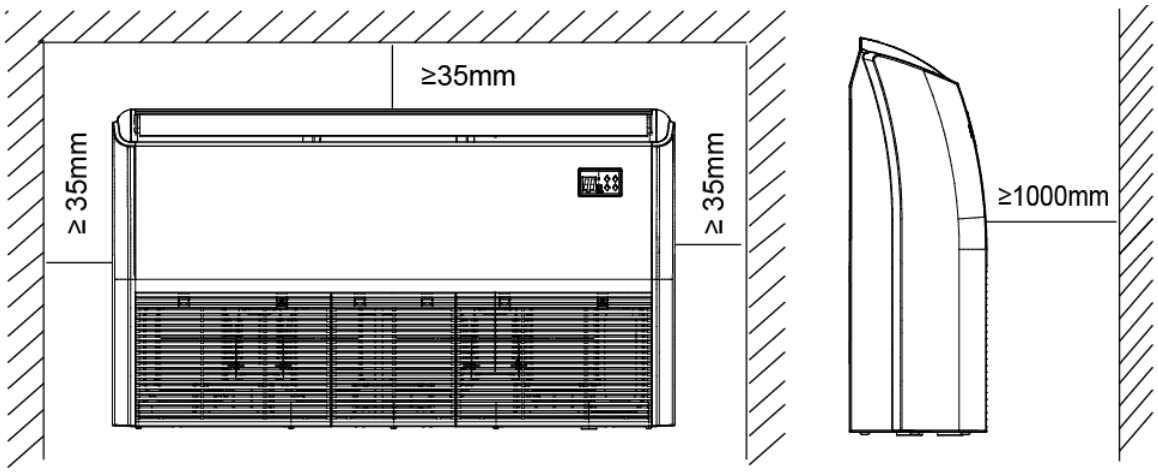
1.7. Remote control and optional wired control method.

2. Dimensions



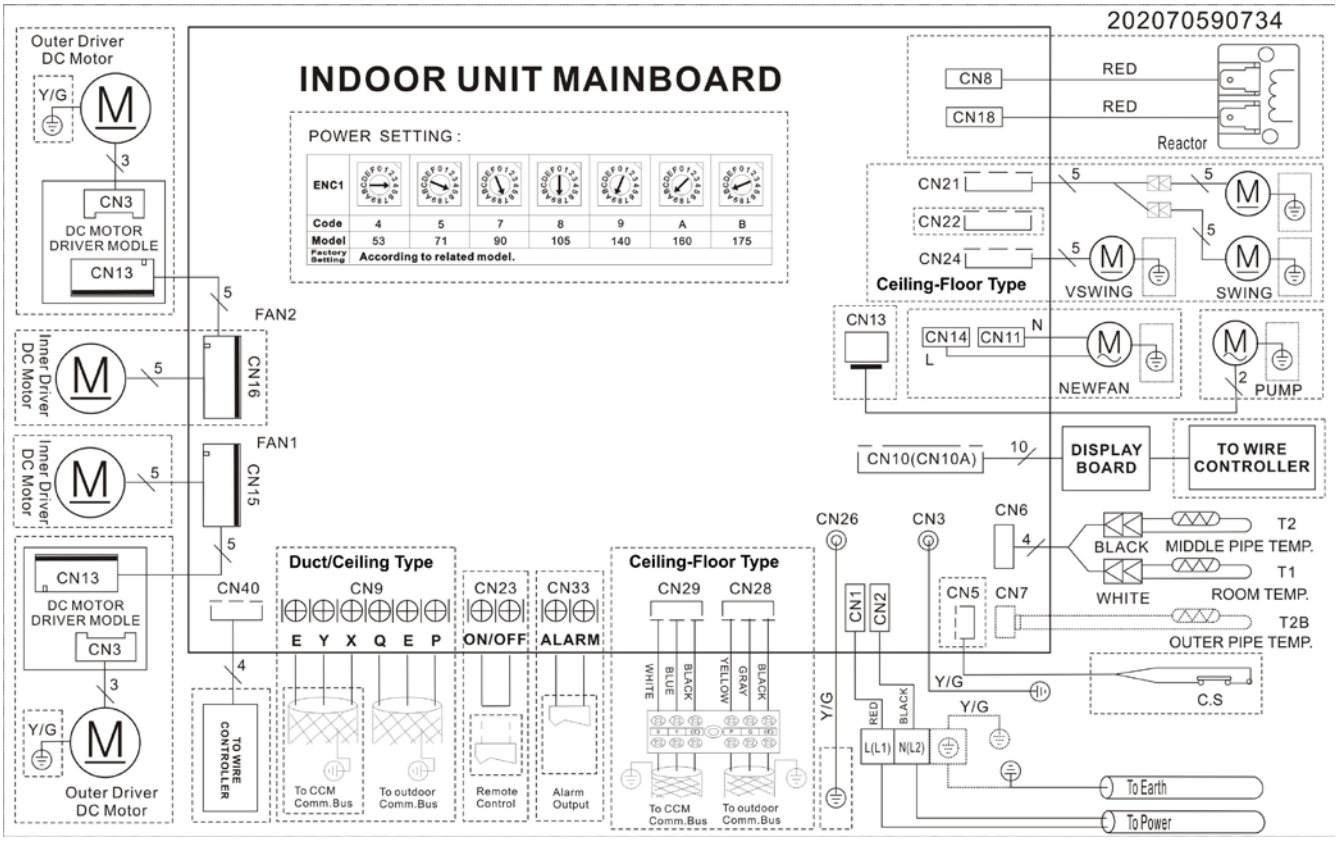
Capacity (Btu/h)	A	B	C	D	E
18K, 24K	1068	675	235	983	220
36K	1285	675	235	1200	220

3. Service Space



4. Wiring Diagrams

KUE-18HRDN1-QRC4 KUE-24HRDN1-QRC4 KUE-24HRFN1-QRC8 KUE-36HRFN1-QRC4



For Setting NETaddress

S1+S2							
Code	0~F	00	0~F	01	0~F	10	0~F 11
NETaddress	0~15		16~31		32~47		48~63
Factory Setting	✓						

For Setting POWER

ENC1							
Code	4	5	7	8	9	A	B
POWER	53	71	90	105	140	160	175
Factory Setting	According to related model.						

For Setting static pressure

ENC2					
Code	0	1	2	3	4
high static pressure	0~50	51~80	81~120	121~150	>150
Middle static pressure	0~25	26~37	38~50	51~100	>100
Factory Setting	✓				

FUNCTION SETTING INDICATION

202070590737

SW1			SW1	SW2	
Code	00	01	10		11
TE1	28	30	Fan motor do not stop.		According to E Function .
TE2	30	32			
TE3	24	28			
TE4	15	24			
TE5	32	35			
TE6	30	32			
Factory Setting	✓				

For temp. compensation

SW6				
TYPE \ Code	00	01	10	11
DUCT TYPE	3℃	4℃	6℃	According to E Function .
/	/	/	/	
CEILING AND FLOOR TYPE	1℃	4℃	6℃	
For Setting CEILING TYPE or FLOOR TYPE	FLOOR TYPE	CEILING TYPE		
Factory Setting	✓			

For Setting Fan Motor Control then No Power Request

SW2		
Mode	Fan OFF	Fan ON
Factory Setting	✓	

For Setting Auto-Restart

SW3		
Mode	ON	OFF
Factory Setting	✓	

For Setting Fan Quantity

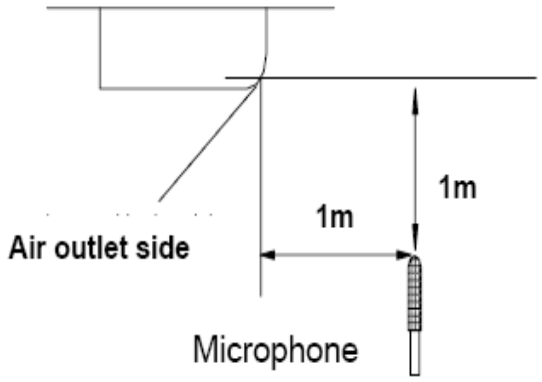
SW4		
Mode	Single Fan	Double Fan
Factory Setting	✓	

5. Electric Characteristics

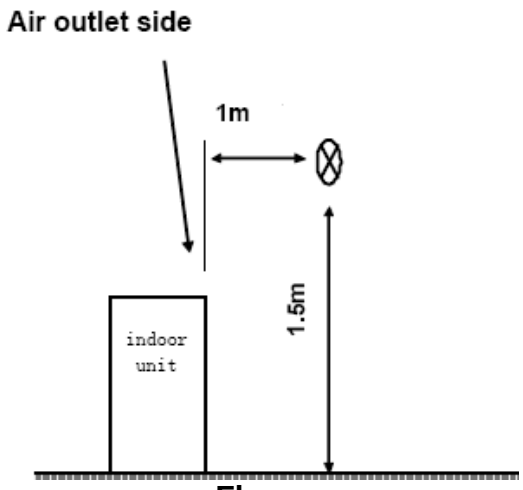
Model	Indoor Units				Power Supply	
	Hz	Voltage	Min.	Max.	MCA	MFA
KUE-18HRDN1-QRC4	50	220-240V	197V	254V	1.25	20
KUE-24HRDN1-QRC4	50	220-240V	197V	254V	1.25	20
KUE-24HRFN1-QRC8	50	220-240V	197V	254V	1.25	20
KUE-36HRFN1-QRC4	50	220-240V	197V	254V	1.25	20

Remark:
MCA: Min. Current Amps. (A)
MFA: Max. Fuse Amps. (A)

6. Sound Levels



Ceiling



Floor

Model	Sound Power dB (A)	Noise level dB(A)		
		H	M	L
KUE-18HRDN1-QRC4	56	40	36	33
KUE-24HRDN1-QRC4	62	50	48	43
KUE-24HRFN1-QRC8	63	50	47	43
KUE-36HRFN1-QRC4	63	52	48	38

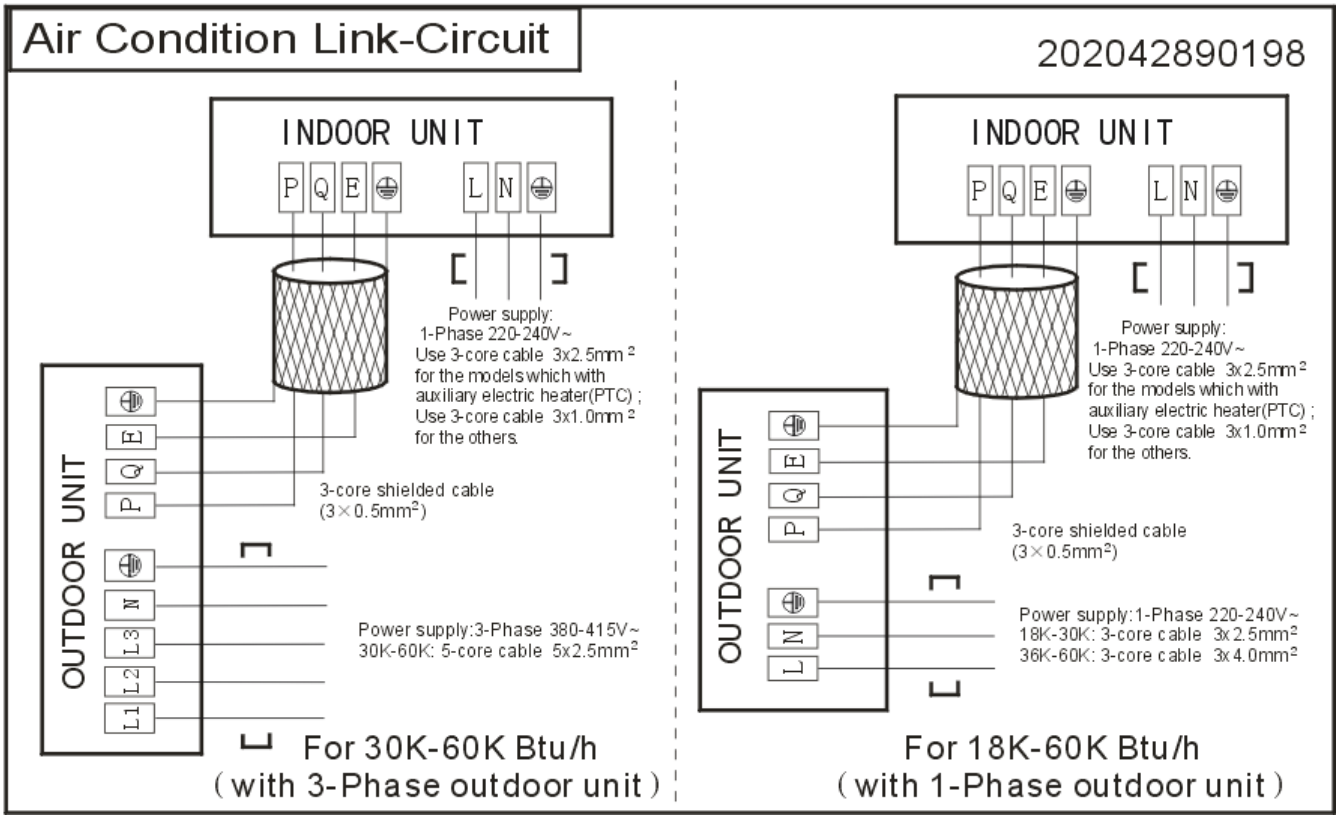
7. Accessories

Remote controller & Its holder	1. Remote controller		1
	2. Remote controller holder		1
	3. Mounting screw (ST2.9×10-C-H)		2
	4. Alkaline dry batteries (AM4)		2
Others	5. Owner's manual	——	1
	6. Installation manual	——	1
	7. Remote controller manual	——	1

8. The Specification of Power

Model		18000-24000Btu/h	36000	36000 Btu/h
INDOOR UNIT POWER	Phase	1-phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm^2)	3×1.0	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	15	15	15
OUTDOOR UNIT POWER	Phase	1-phase	1-phase	3-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	380-420V, 50Hz
	POWER WIRING (mm^2)	3×2.5	3×4.0	5×2.5
	CIRCUIT BREAKER (A)	30	40	30
Indoor/Outdoor Connecting Wiring (Weak Electric Signal) (mm^2)		3×0.5	3×0.5	3×0.5
Indoor/Outdoor Connecting Wiring (Strong Electric Signal) (mm^2)		——	——	——

9. Field Wiring



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Outdoor Units

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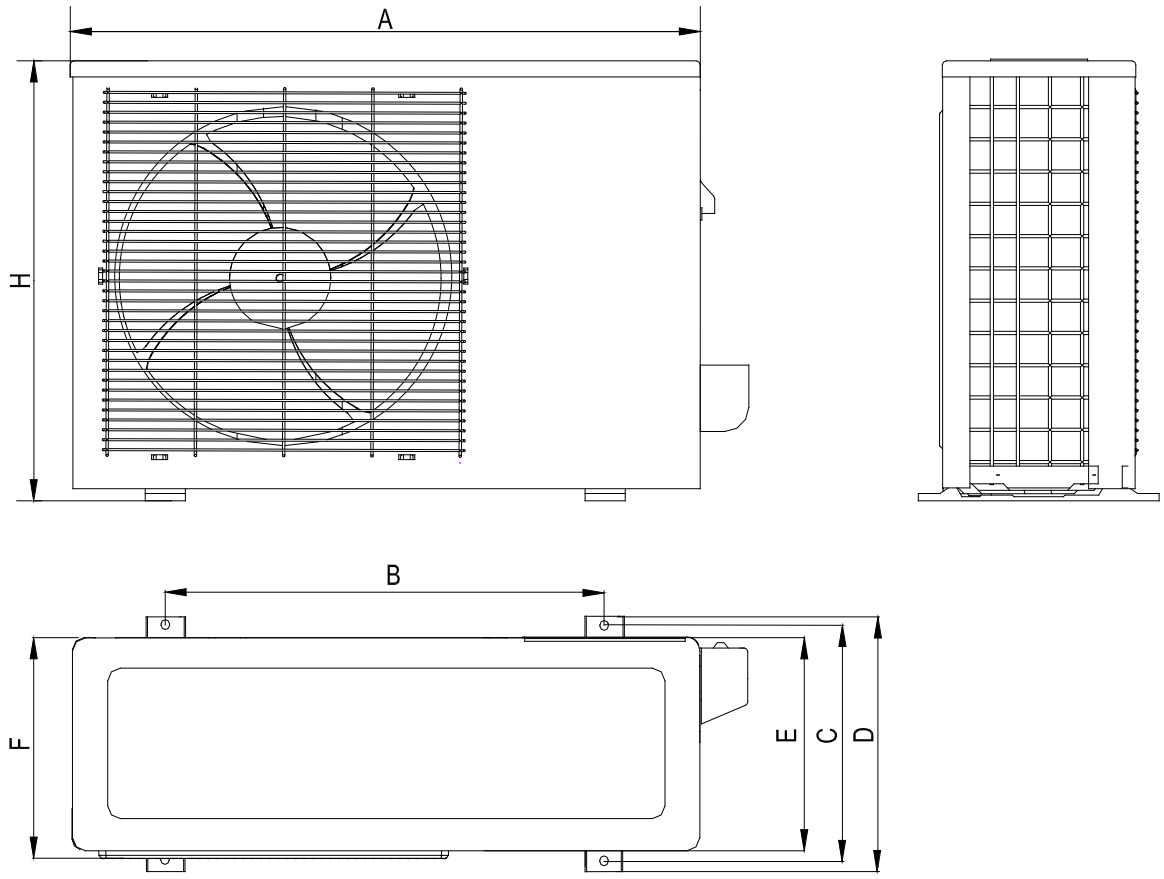
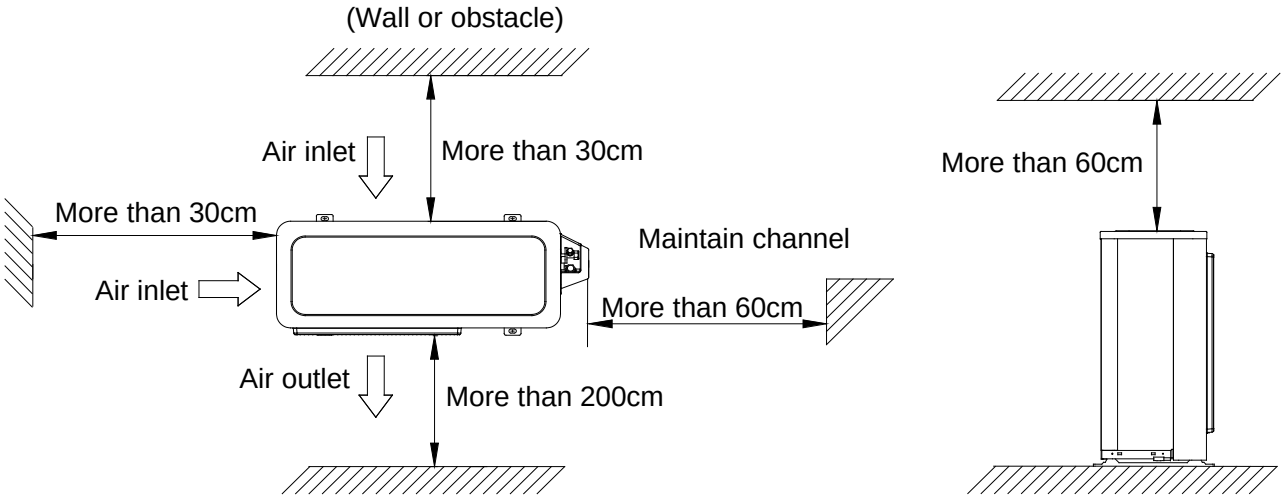
1. Dimensions



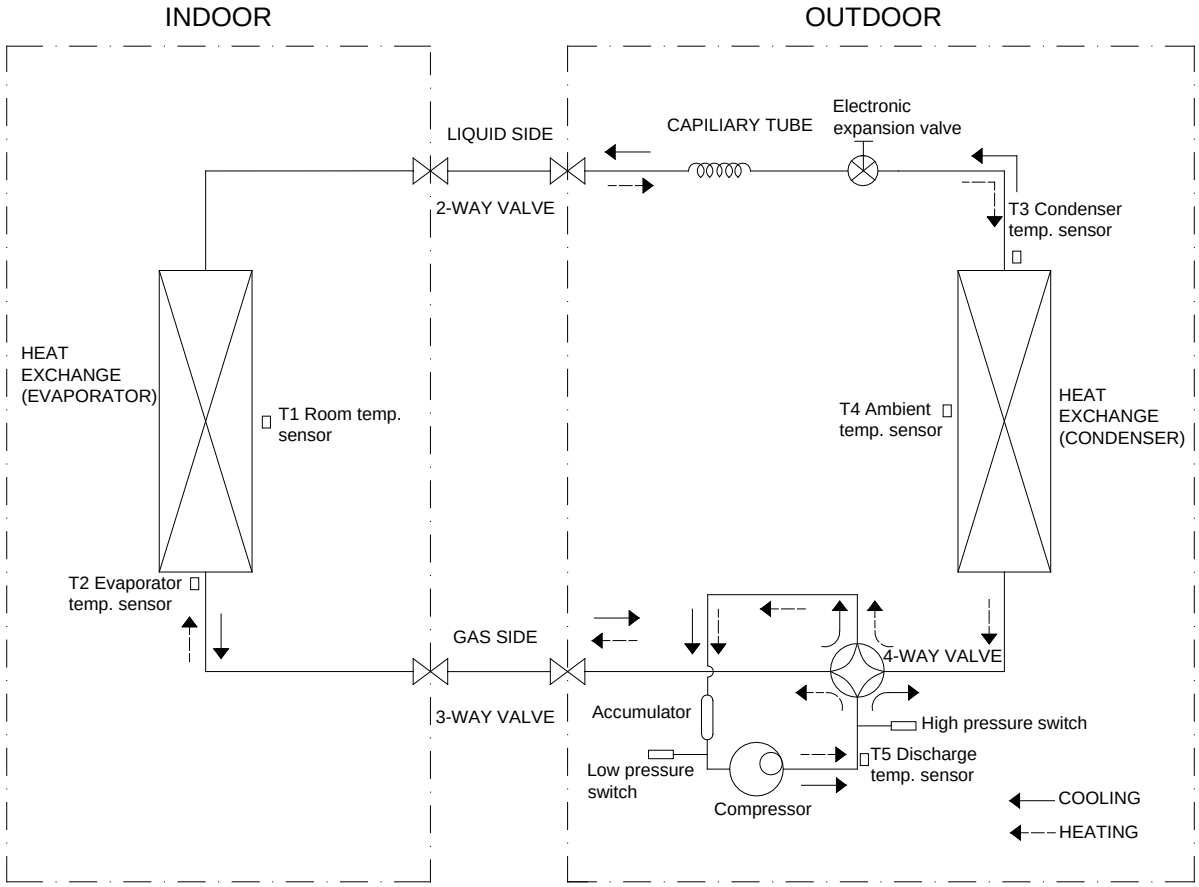
Model	Unit：mm						
	A	B	C	D	E	F	H
KOU-18HFN1-QRC4	845	560	335	360	313	324	700
KOU-24HFN1-QRC4	895	590	333	355	302	313	862
KOU-24HFN1-QRC8	895	590	333	355	302	313	862
KOU-36HFN1-QRC4	990	624	366	396	340	354	966
KOU-36HFN1-RRC4	990	624	366	396	340	354	966

2. Service Space

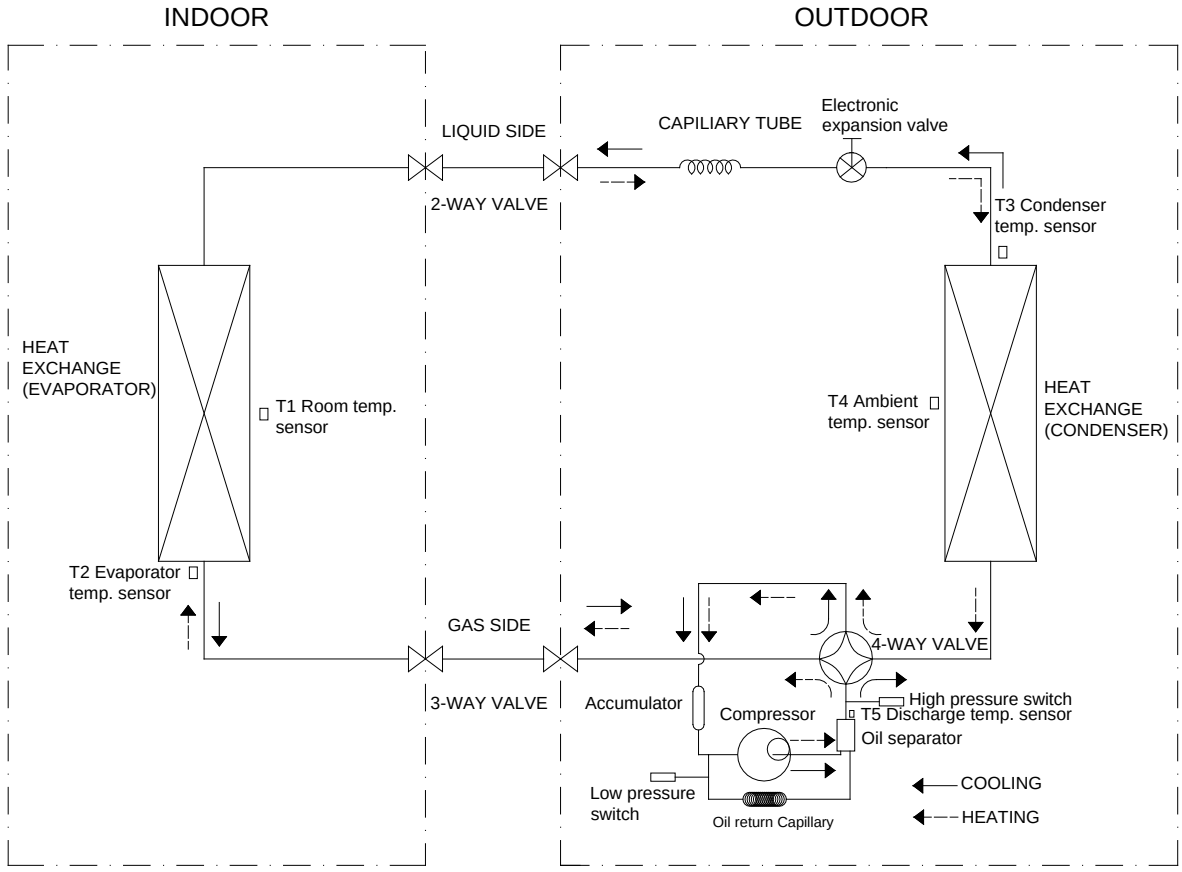


3. Piping Diagrams

KOU-18HFN1-QRC8 KOU-24HFN1-QRC4 KOU-24HFN1-QRC8

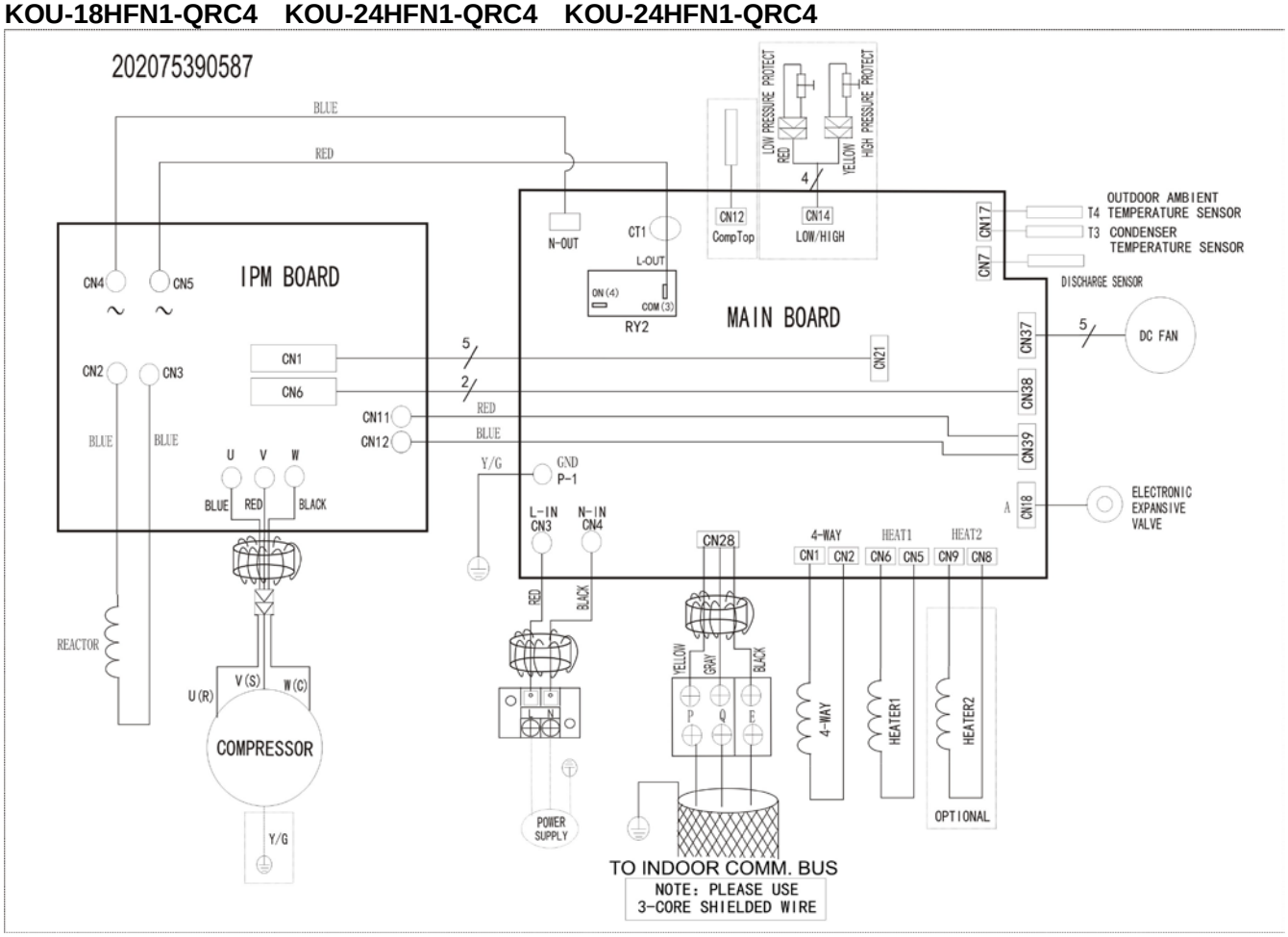


KOU-36HFN1-QRC4 KOU-36HFN1-RRC4

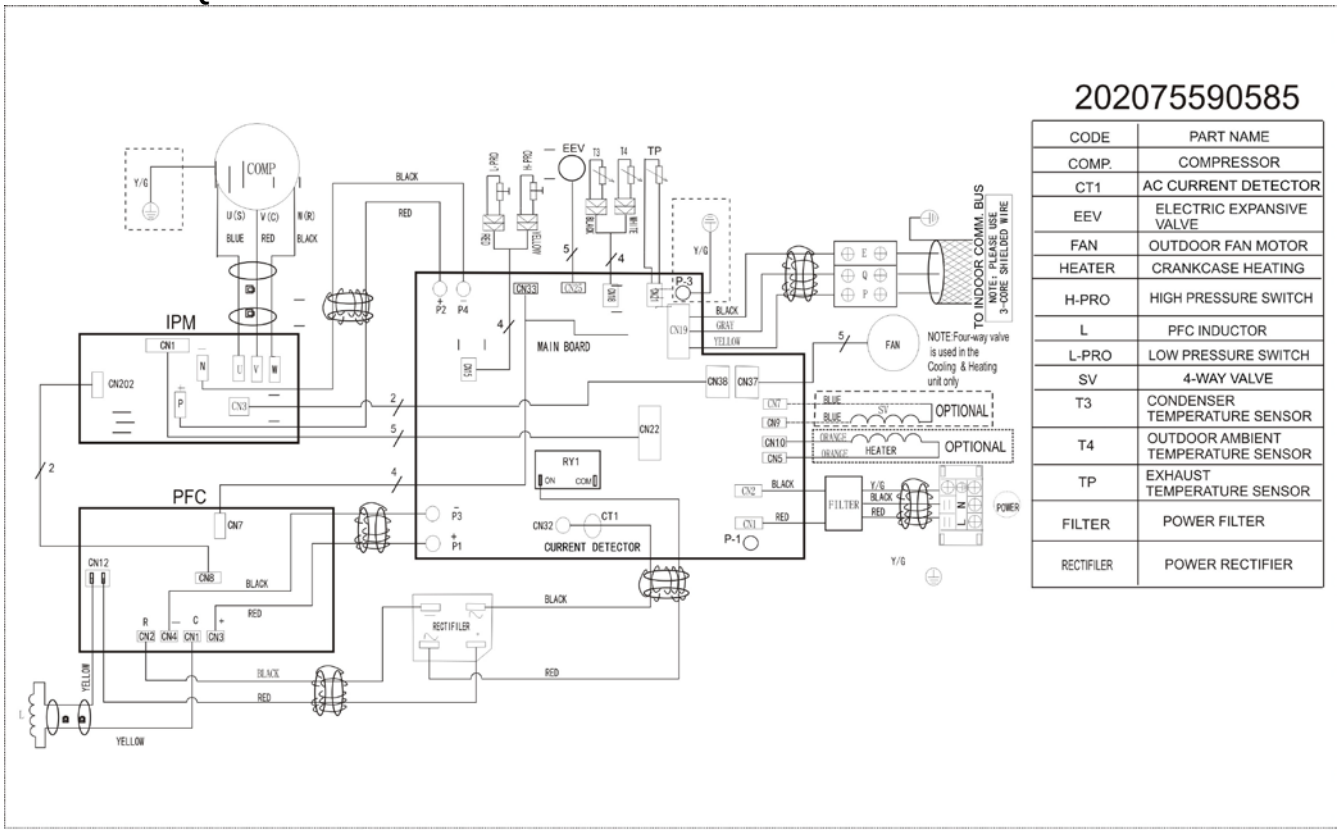


4. Wiring Diagrams

KOU-18HFN1-QRC4 KOU-24HFN1-QRC4 KOU-24HFN1-QRC4

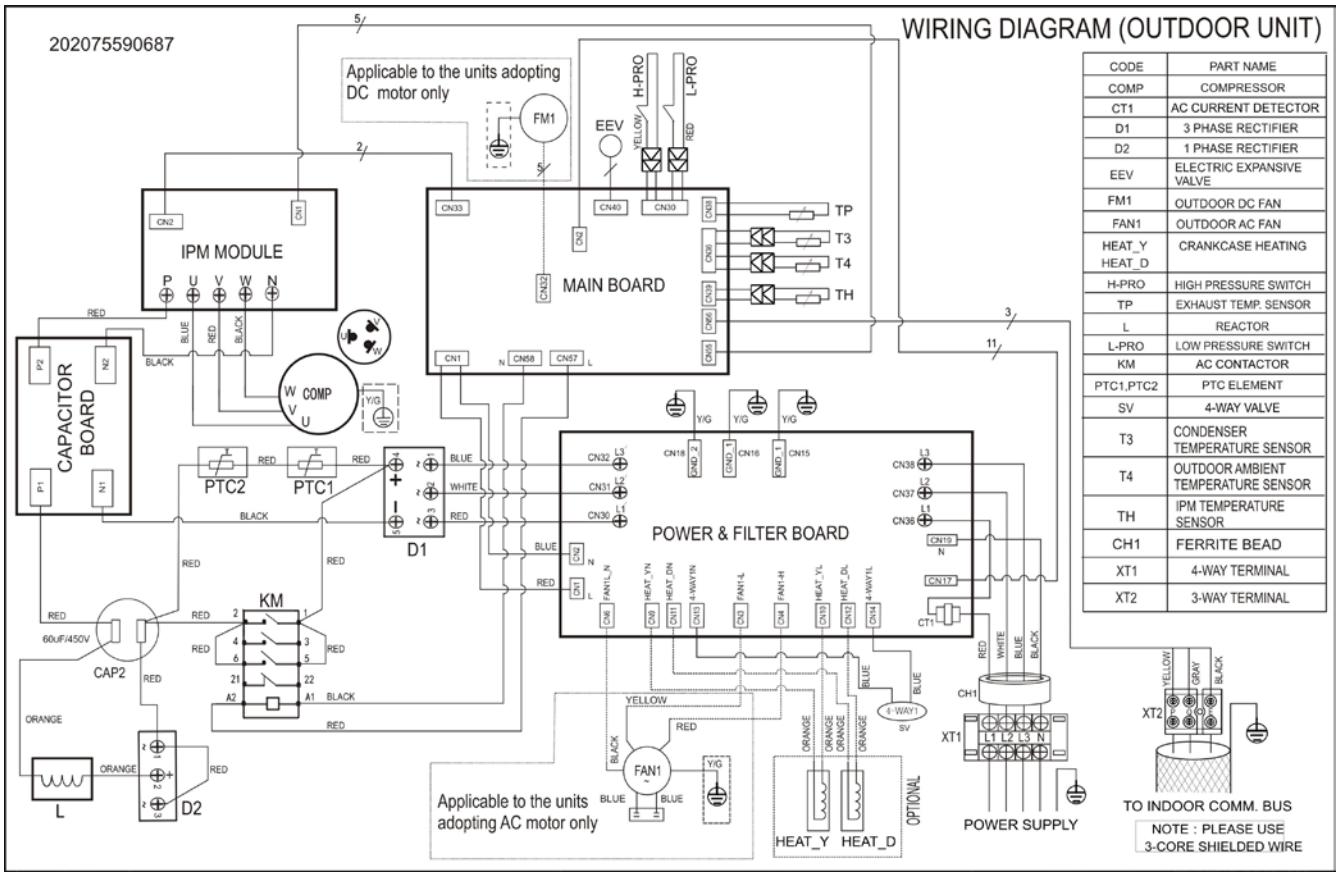


KOU-36HFN1-QRC4



CODE	PART NAME
COMP.	COMPRESSOR
CT1	AC CURRENT DETECTOR
EEV	ELECTRIC EXPANSIVE VALVE
FAN	OUTDOOR FAN MOTOR
HEATER	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TP	EXHAUST TEMPERATURE SENSOR
FILTER	POWER FILTER
RECTIFILER	POWER RECTIFIER

KOU-36HFN1-RRC4



CODE	PART NAME
COMP	COMPRESSOR
CT1	AC CURRENT DETECTOR
D1	3 PHASE RECTIFIER
D2	1 PHASE RECTIFIER
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
FAN1	OUTDOOR AC FAN
HEAT_Y HEAT_D	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
TP	EXHAUST TEMP. SENSOR
L	REACTOR
L-PRO	LOW PRESSURE SWITCH
KM	AC CONTACTOR
PTC1,PTC2	PTC ELEMENT
SV	4-WAY VALVE
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	IPM TEMPERATURE SENSOR
CH1	FERRITE BEAD
XT1	4-WAY TERMINAL
XT2	3-WAY TERMINAL

5. Electric Characteristics

Model	Outdoor Unit			
	Hz	Voltage	Min.	Max.
KOU-18HFN1-QRC4	50	220-240V	198V	254V
KOU-24HFN1-QRC4	50	220-240V	198V	254V
KOU-24HFN1-QRC8	50	220-240V	198V	254V
KOU-36HFN1-QRC4	50	220-240V	198V	254V
KOU-36HFN1-RRC4	50	380-415V	342V	440V

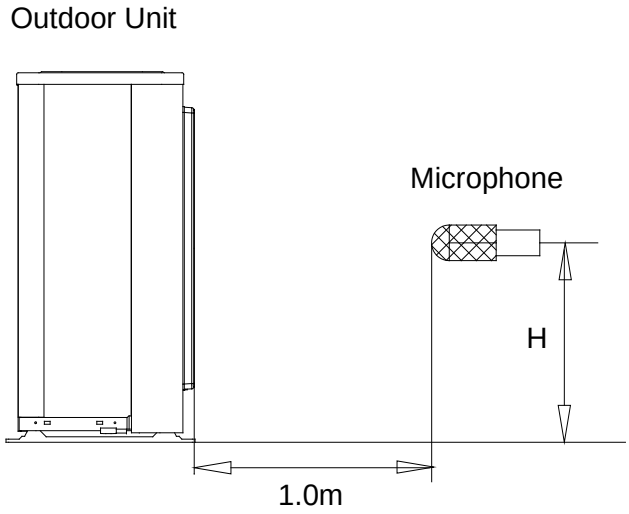
6. Operation Limits

Temperature / Mode	Cooling operation	Heating operation
Room temperature	⩾17˚C	≤30˚C
Outdoor temperature	-15˚C～50˚C	-15˚C～24˚C

CAUTION:

1. If the air conditioner is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.
2. The room relative humidity should be less than 80%. If the air conditioner operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.
3. The optimum performance will be achieved during this operating temperature zone.

7. Sound Levels



Note: H= 0.5 × height of outdoor unit

Model	Sound Power dB(A)
KOU-18HFN1-QRC4	**65**
KOU-24HFN1-QRC4	**69**
KOU-24HFN1-QRC8	**69**
KOU-36HFN1-QRC4	**69**
KOU-36HFN1-RRC4	**70**

Part 4
Installation

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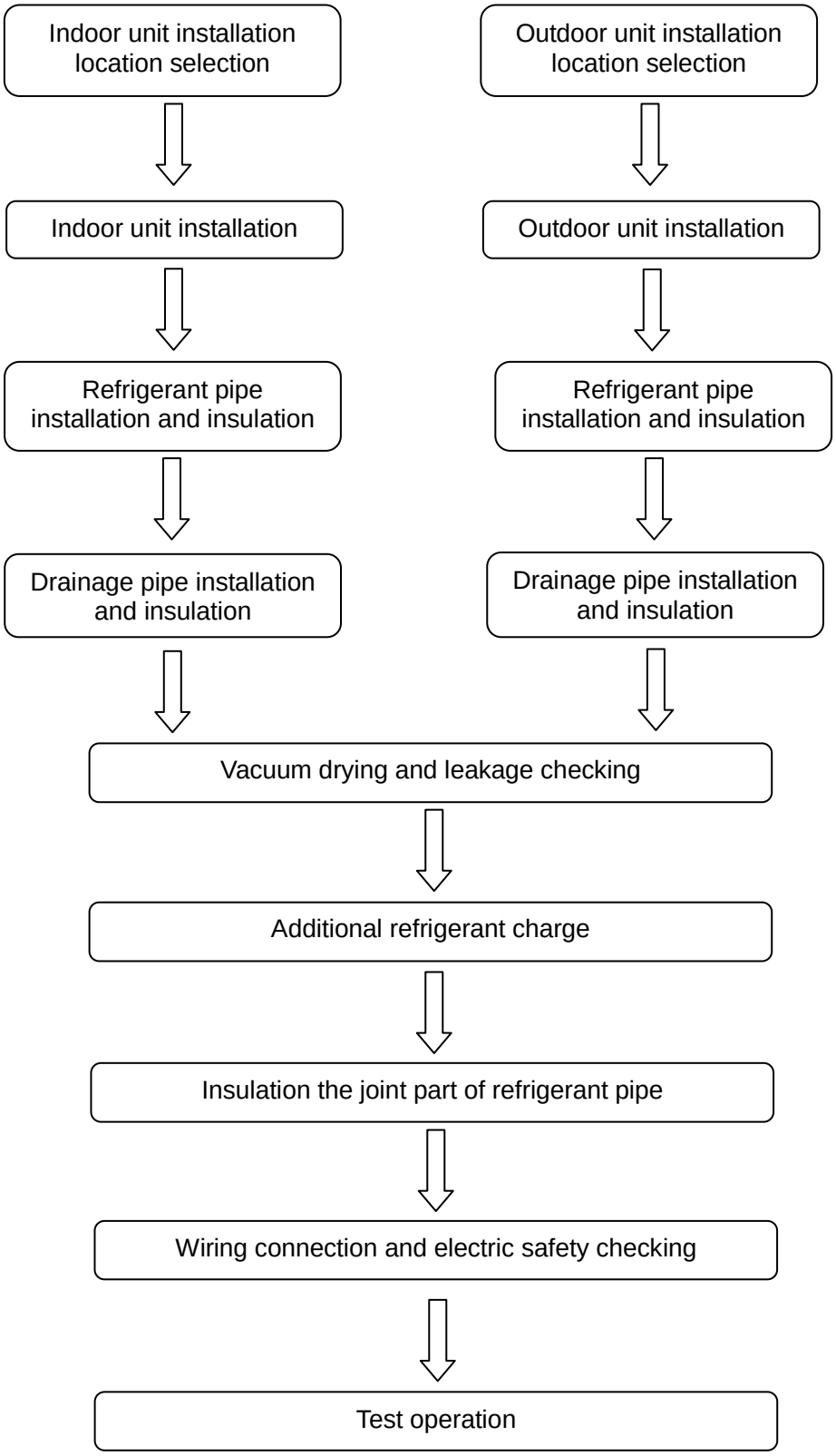
6. Drainage pipe installation 68
7. Vacuum Drying and Leakage Checking 72
8. Additional refrigerant charge.....73
9. Engineering of insulation.....74
10. Engineering of electrical wiring.....76
11. Test operation 77

1. Installation Procedure


Indoor unit installation location selection
Outdoor unit installation location selection
Indoor unit installation
Outdoor unit installation
Refrigerant pipe installation and insulation
Refrigerant pipe installation and insulation
Drainage pipe installation and insulation
Drainage pipe installation and insulation
Vacuum drying and leakage checking
Additional refrigerant charge
Insulation the joint part of refrigerant pipe
Wiring connection and electric safety checking
Test operation

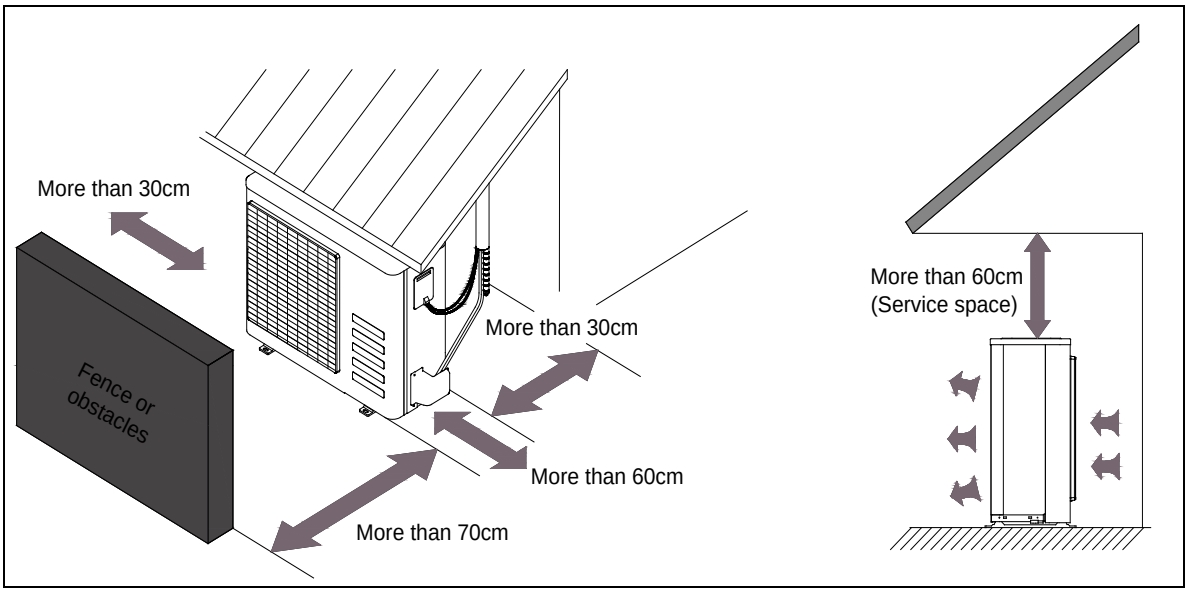
2. Location selection

2.1 Indoor unit location selection

- The place shall easily support the indoor unit's weight.
- The place can ensure the indoor unit installation and inspection.
- The place can ensure the indoor unit horizontally installed.
- The place shall allow easy water drainage.
- The place shall easily connect with the outdoor unit.
- The place where air circulation in the room should be good.
- There should not be any heat source or steam near the unit.
- There should not be any oil gas near the unit
- There should not be any corrosive gas near the unit
- There should not be any salty air neat the unit
- There should not be strong electromagnetic wave near the unit
- There should not be inflammable materials or gas near the unit
- There should not be strong voltage vibration.

2.2 Outdoor unit location selection

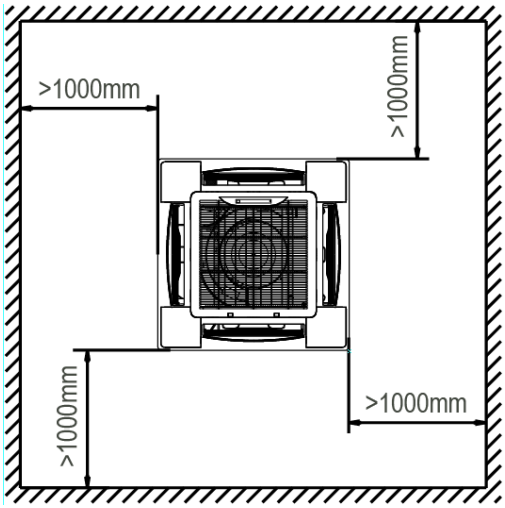
- The place shall easily support the outdoor unit's weight.
- Locate the outdoor unit as close to indoor unit as possible
- The piping length and height drop can not exceed the allowable value.
- The place where the noise, vibration and outlet air do not disturb the neighbors.
- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and not face the strong wind.
- It is easy to install the connecting pipes and cables.
- There is no danger of fire due to leakage of inflammable gas.
- It should be a dry and well ventilation place
- The support should be flat and horizontal
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- If is built over the unit to prevent direct sunlight, rain exposure, direct strong wend, snow and other scraps accumulation, make sure that heat radiation from the condenser is not restricted.

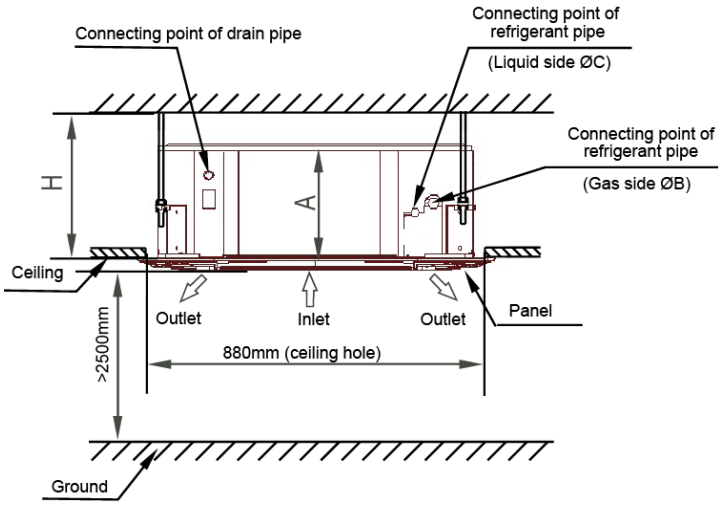


3. Indoor unit installation

3.1 Supper slim cassette indoor unit installation

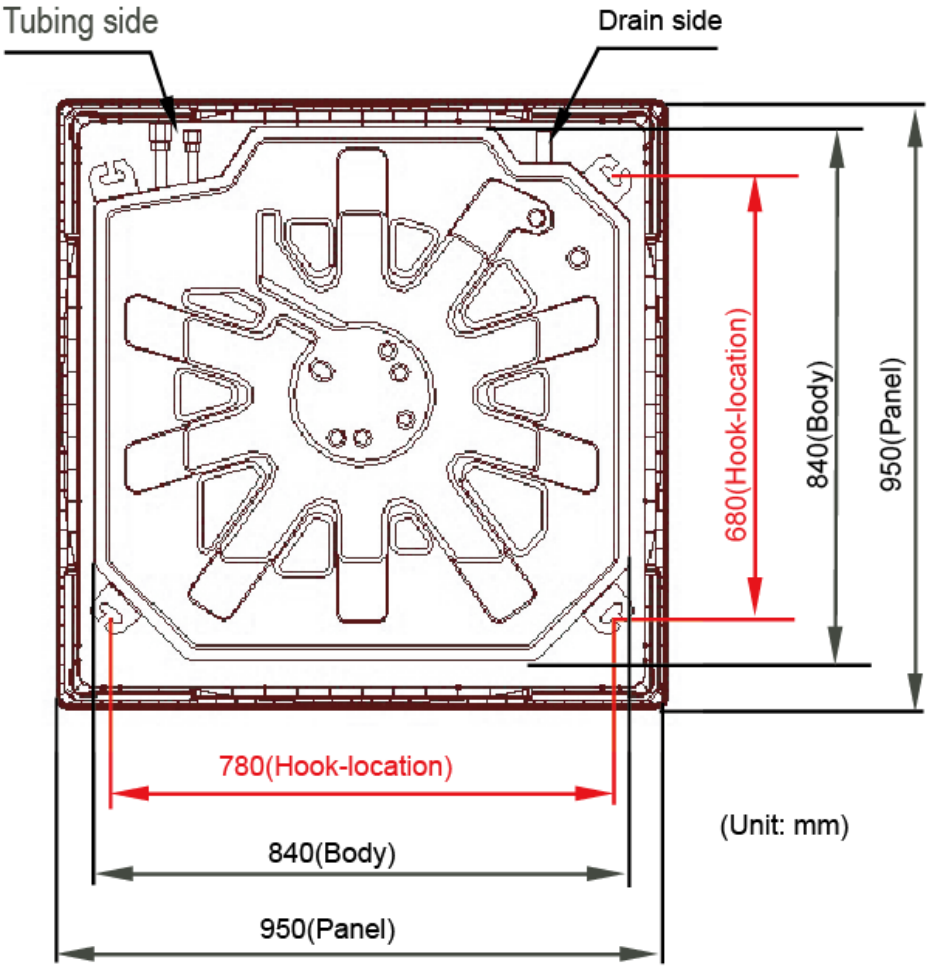
3.1.1 Service space for indoor unit





Model	A	H	Remark	
24-30	205	>235	R410A and R22	Cooling / Cooling & Heating
36-48	245	>275	R410A and R22	Cooling / Cooling & Heating

3.1.2 Bolt pitch



3.1.3 Install the pendant bolt

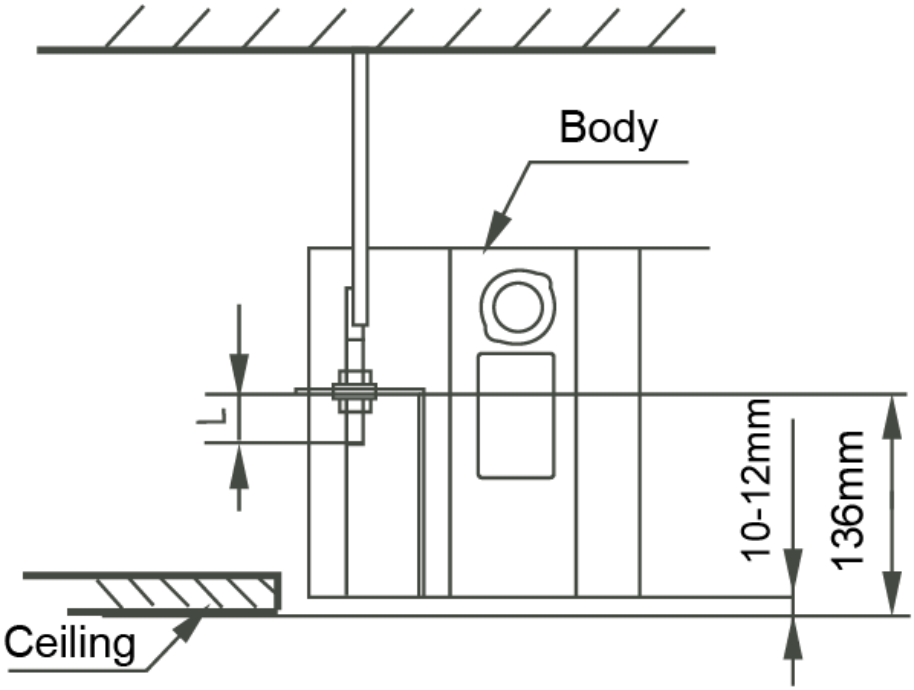
Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

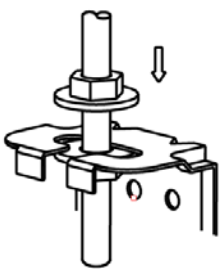
3.1.4 Install the main body

Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within ±1°.

Adjust the position to ensure the gaps between the body and the four sides of ceiling are even. The body's lower part should sink into the ceiling for 10~12 mm. In general, L is half of the screw length of the installation hook.

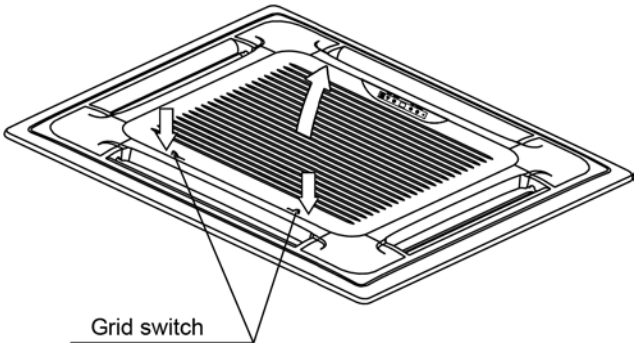


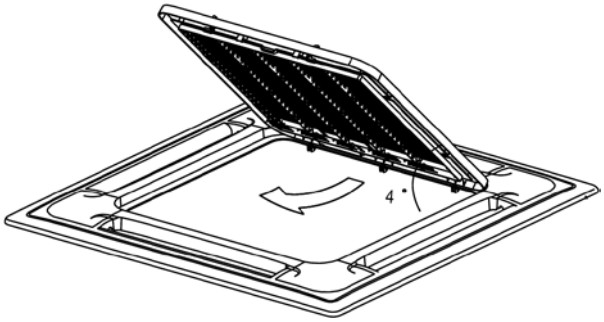
Locate the air conditioner firmly by wrenching the nuts after having adjusted the body's position well.



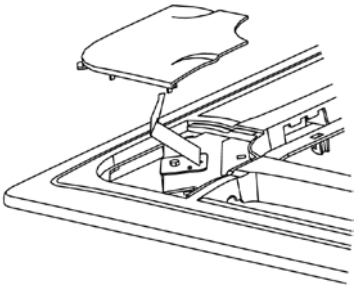
3.1.5 Install the panel

Remove the grille

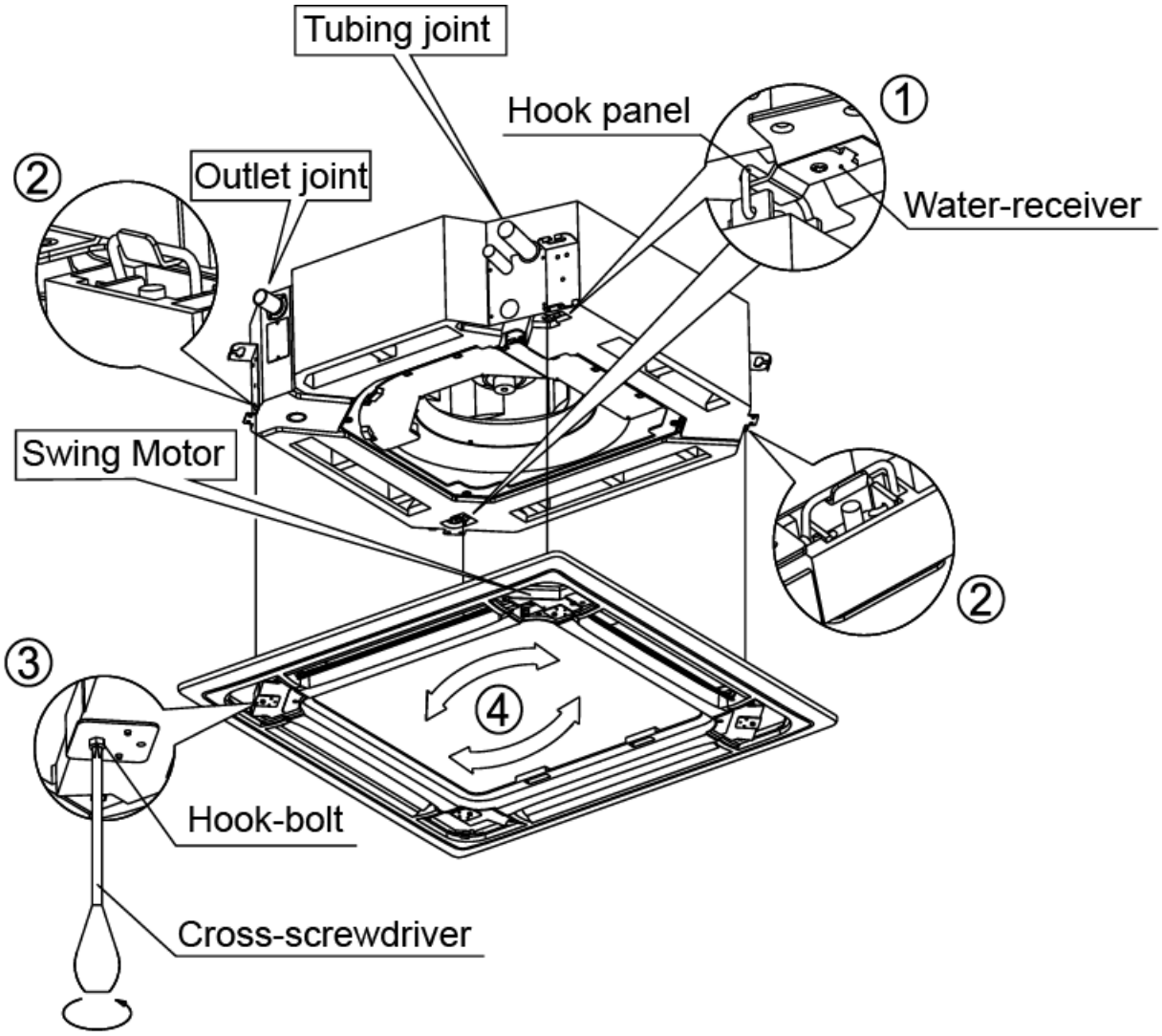




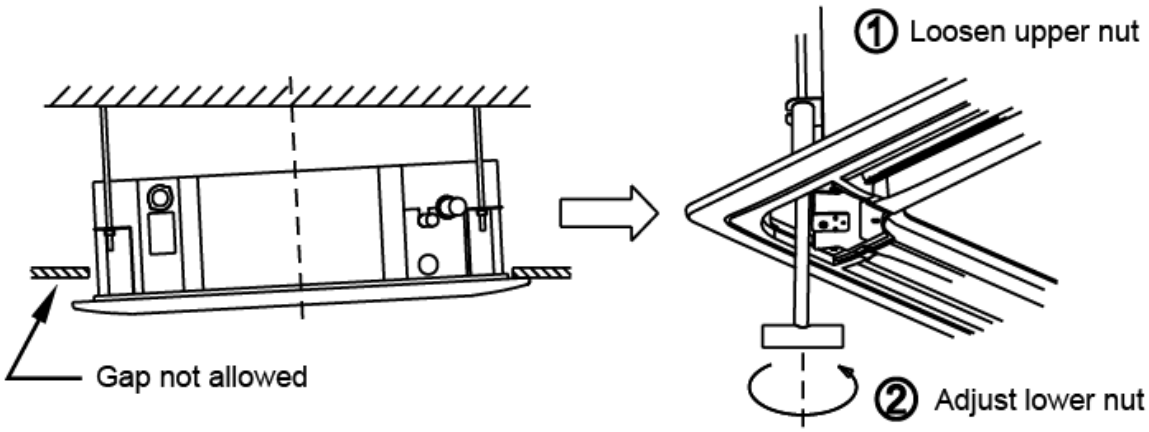
Remove the 4 corner covers.

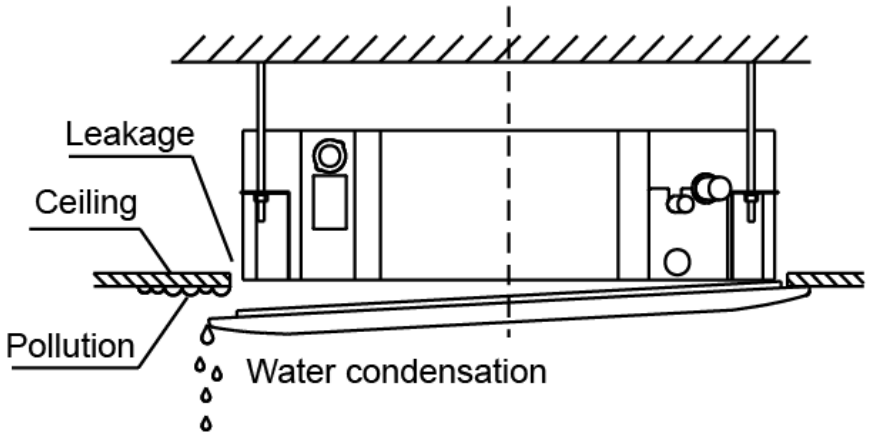


Hang the panel to the hooks on the mainbody. If the panel is with auto-lift grille, please watch the ropes lifing the grille, DO NOT make the ropes enwinded or blocked.



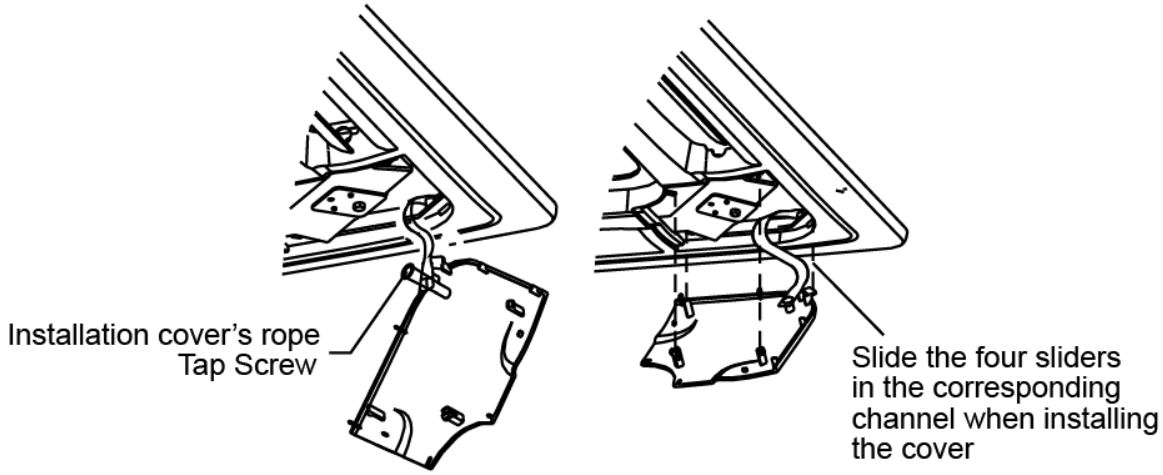
Tighten the screws under the panel hooks till the panel closely stick on the ceiling to avoid condensate water.





Hang the air-in grill to the panel, then connect the lead terminator of the swing motor and that of the control box with corresponding terminators on the body respectively.

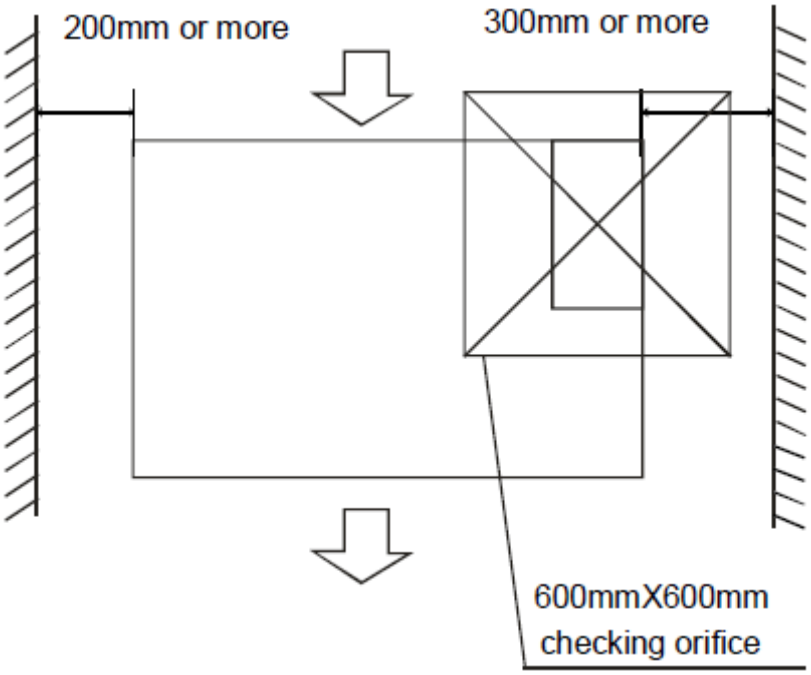
Install the 4 corner covers back.



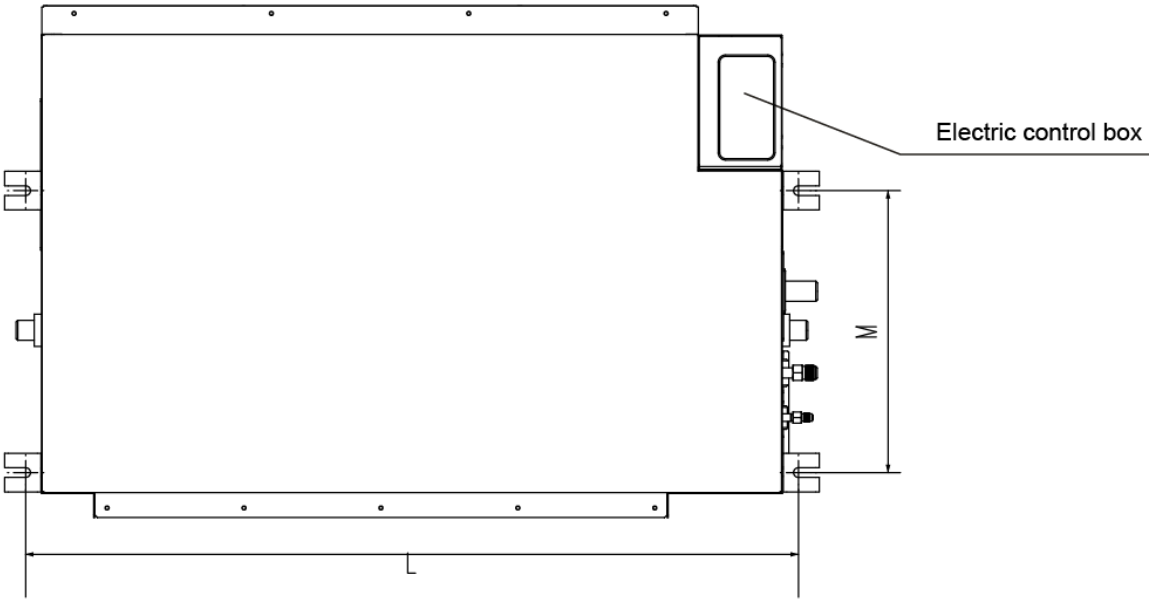
Note: The panel shall be installed after the wiring connected.

3.2 A5 duct indoor unit installation

3.2.1 Service space for indoor unit



3.2.2 Bolt pitch



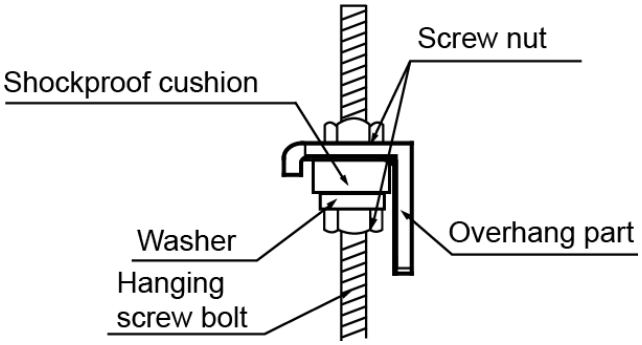
Capacity(KBtu)	Size of outline dimension mounted plug	
	L	M
24	960	350
30/36	1180	490
48/60	1240	500

3.2.3 Install the pendant bolt

Select the position of installation hooks according to the hook holes positions showed in upper picture.
Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

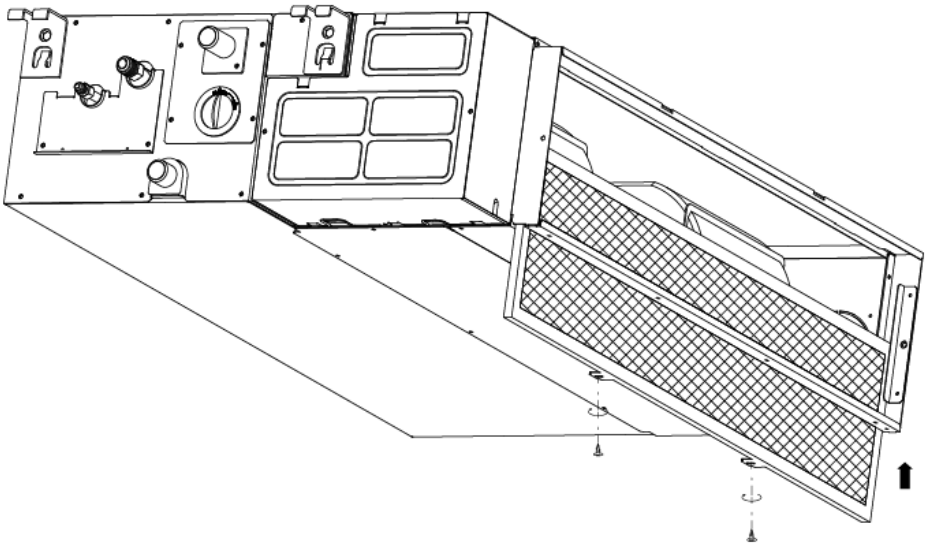
3.2.4 Install the main body

Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within ±1°.



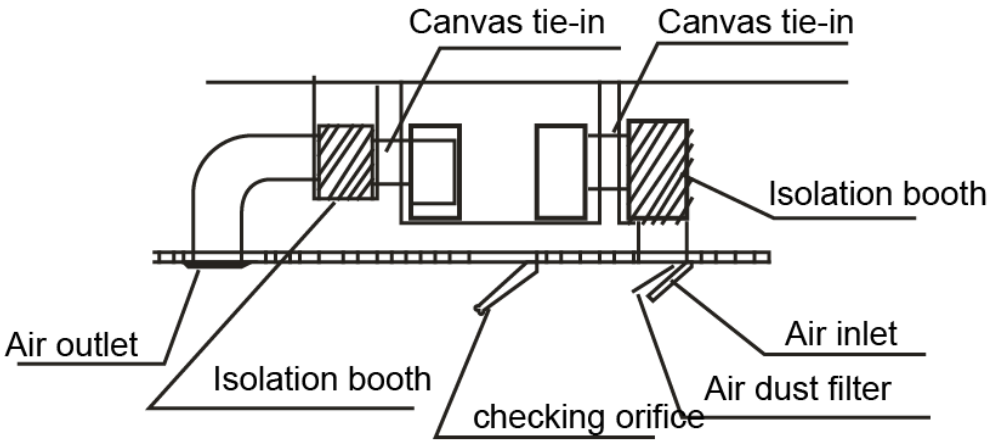
3.2.5 Install the air filter

Insert the air filter through the filter slot and fix it with 2 screws.



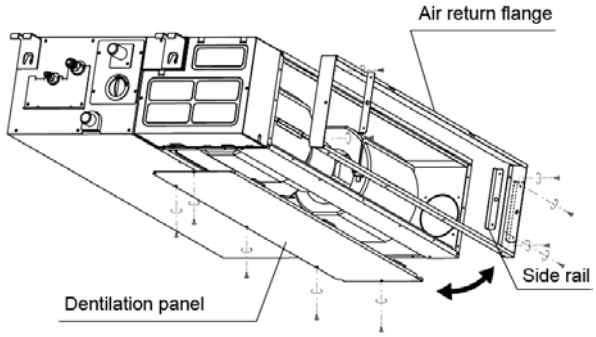
3.2.6 Install the air duct

Please design the air duct as below recommended picture

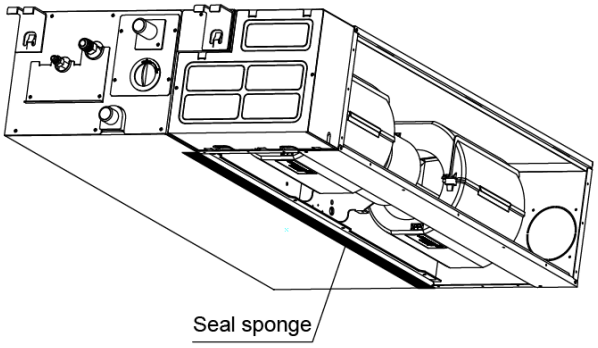


3.3.7 Change the air inlet direction

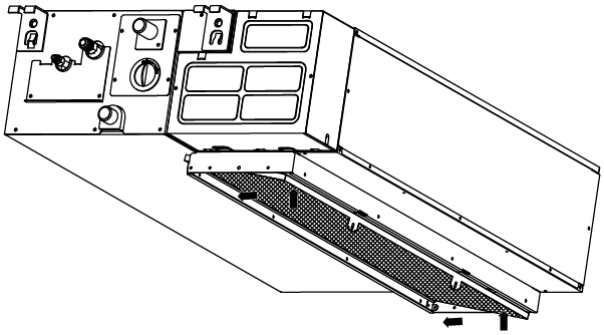
① Take off ventilation panel and flange, cut off the staples at side rail.



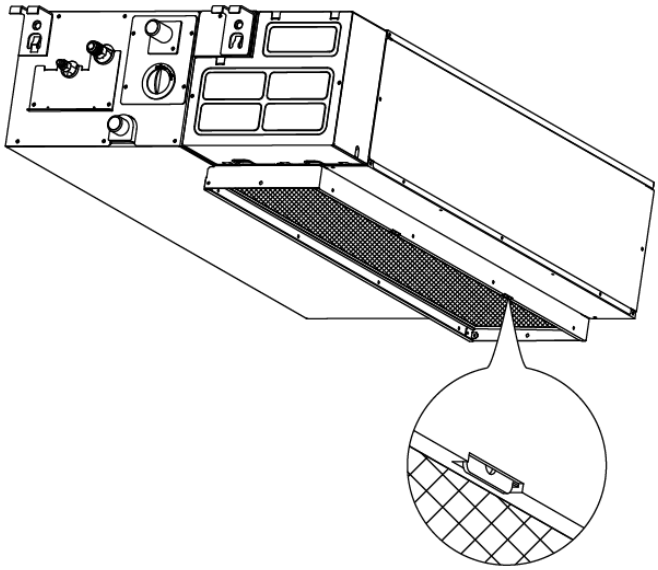
② Stick the attached seal sponge as per the indicating place in the following fig, and then change the mounting positions of air return panel and air return flange .



③ When install the filter mesh, please plug it into flange inclined from air return opening, and then push up.

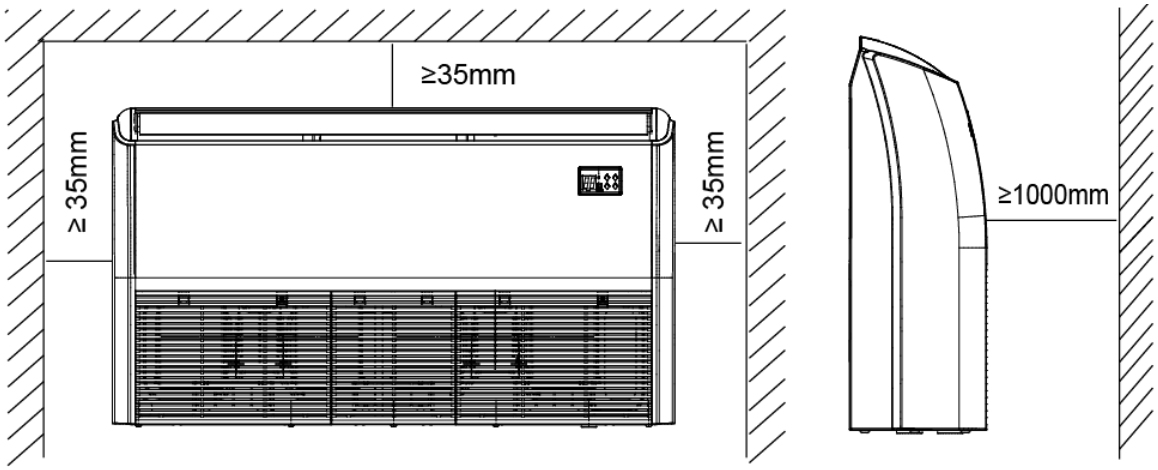


④ The installation has finish, upon filter mesh which fixing blocks have been insert to the flange positional holes.



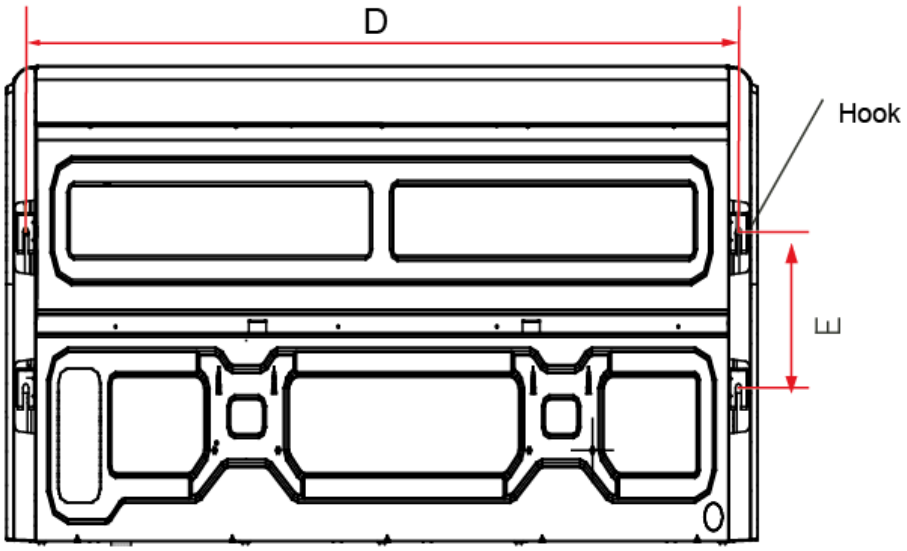
3.3 Ceiling & floor indoor unit installation

3.3.1 Service space for indoor unit



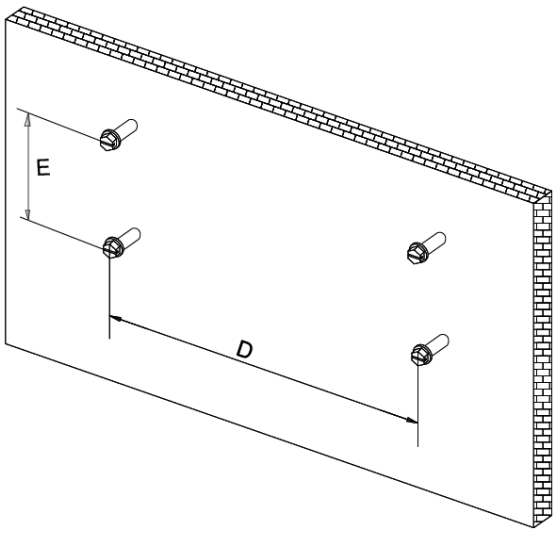
3.3.2 Bolt pitch

① Ceiling installation



Capacity (Btu/h)	D	E
18K, 24K	983	220
36K	1200	220
48K, 60K	1565	220

② Wall-mounted installation



3.3.3 Install the pendant bolt

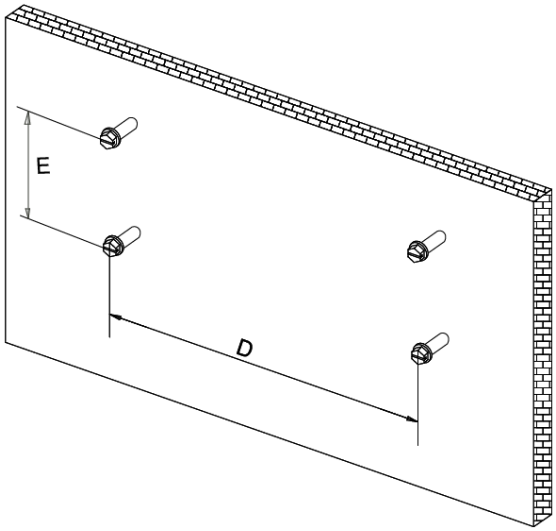
① Ceiling installation

Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

② Wall-mounted installation

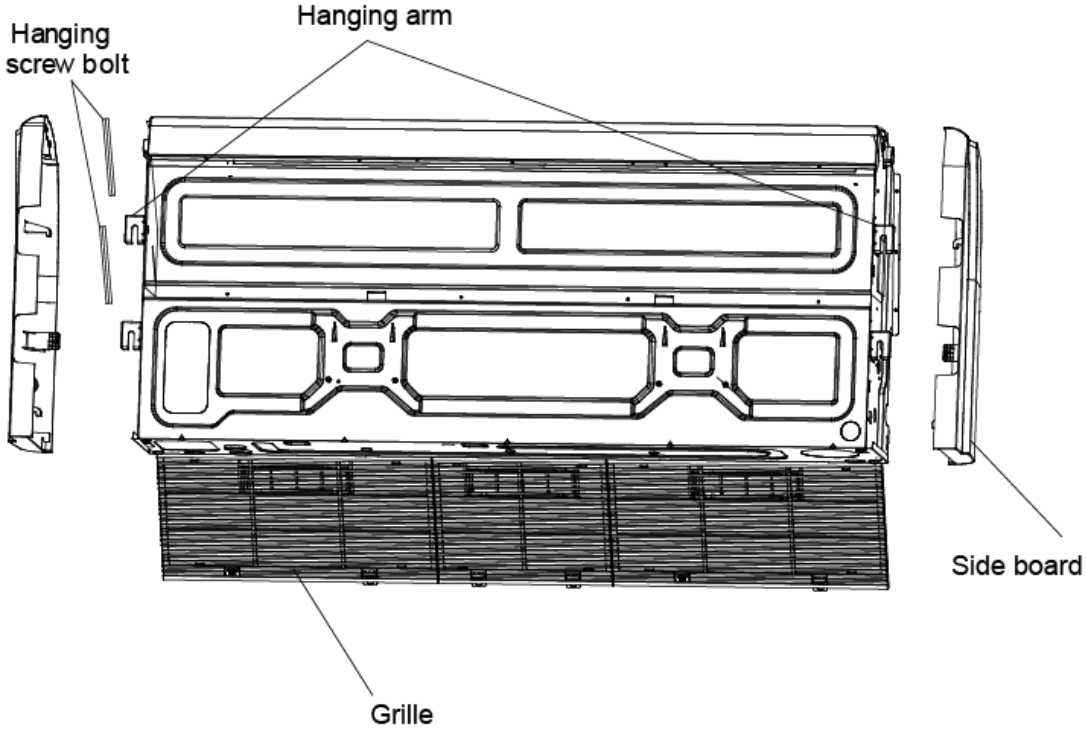
Install the tapping screws onto the wall.(Refer to picture below)



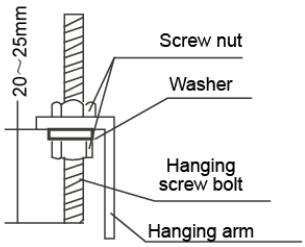
3.3.4 Install the main body

① Ceiling installation (The only installation method for the unit with drain pump)

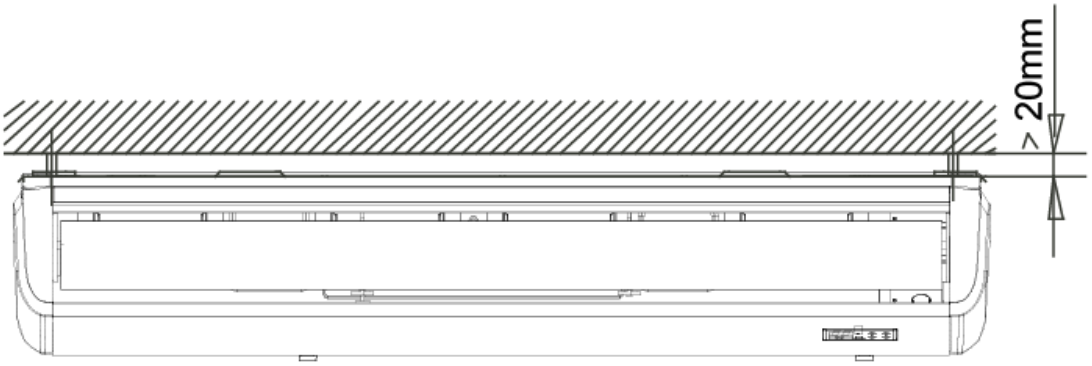
Remove the side board and the grille.

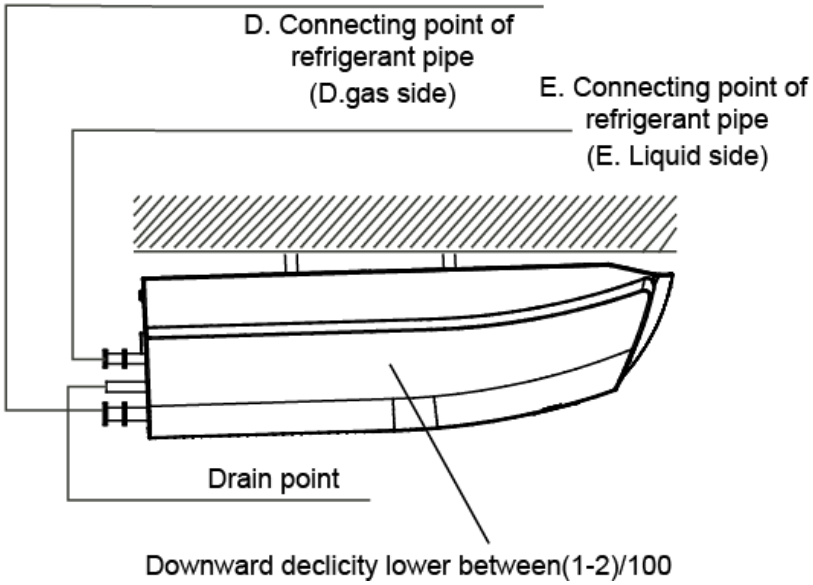


Locate the hanging arm on the hanging screw bolt. Prepare the mounting bolts on the unit.



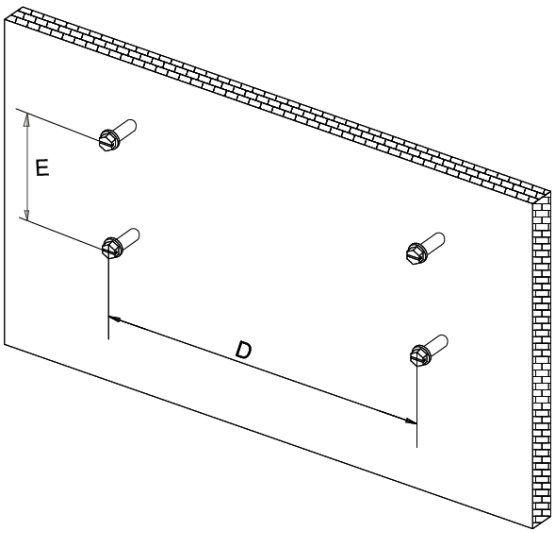
Put the side panels and grilles back.

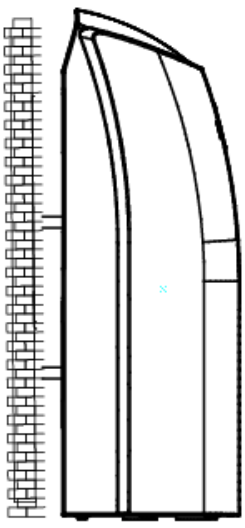



D. Connecting point of refrigerant pipe (D.gas side)
E. Connecting point of refrigerant pipe (E. Liquid side)
Drain point
Downward declicity lower between(1-2)/100

② Wall-mounted installation

Hang the indoor unit by insert the tapping screws into the hanging arms on the main unit. (The bottom of body can touch with floor or suspended, but the body must install vertically.)





4. Outdoor unit installation (Side Discharge Unit)

4.1 Service space for outdoor unit

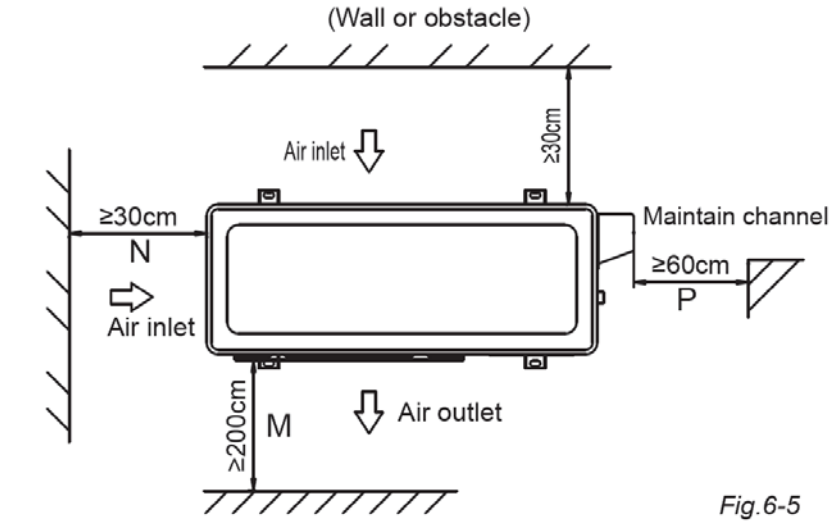
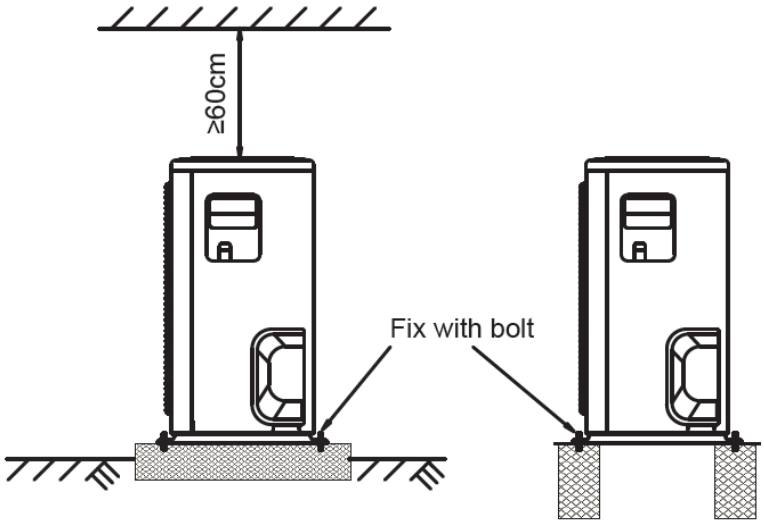
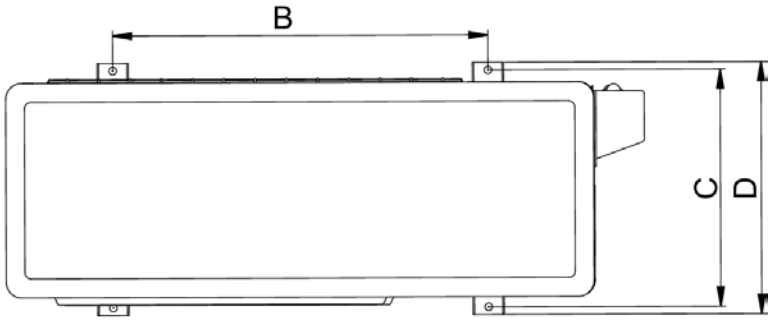


Fig.6-5



4.2 Bolt pitch

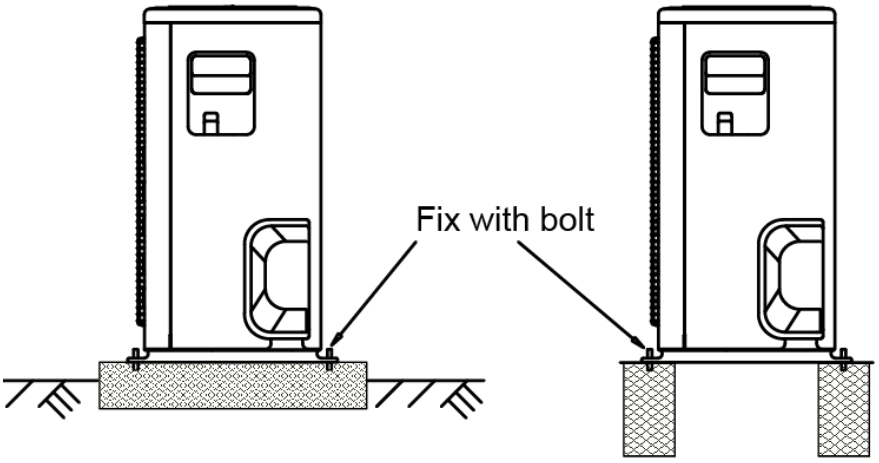


Model	B	C	D
18K	560	335	360
24K	590	333	355
36K	624	366	396

4.3 Install the Unit

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.
Never hold the inlet of the outdoor unit to prevent it from deforming.
Do not touch the fan with hands or other objects.

Do not lean it more than 45, and do not lay it sidelong.
Make concrete foundation according to the specifications of the outdoor units.
Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.



5. Refrigerant pipe installation

5.1 Maximum pipe length and height drop

Considering the allowable pipe length and height drop to decide the installation position. Make sure the distance and height drop between indoor and outdoor unit not exceeded the date in the following table.

Model	Max. Length	Max. Elevation
24,000Btu/h-30,000Btu/h	50m	25m
36,000Btu/h-48,000Btu/h	65m	30m

5.2 The procedure of connecting pipes

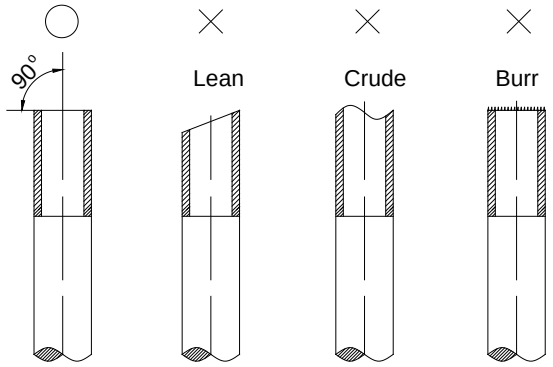
5.2.1 Choose the pipe size according to the specification table.

5.2.2 Confirm the cross way of the pipes.

5.2.3 Measure the necessary pipe length.

5.2.4 Cut the selected pipe with pipe cutter

- Make the section flat and smooth.

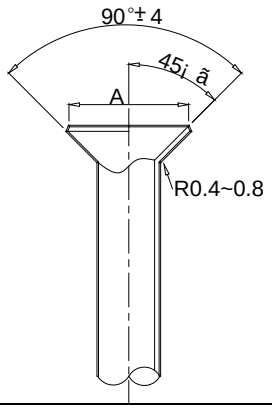


5.2.5 Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

5.2.6 Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe

Pipe diameter	Flare dimension A (mm)		Flare shape
	Min	Max	
1/4" (6.35)	8.3	8.7	
3/8" (9.52)	12.0	12.4	
1/2" (12.7)	15.4	15.8	
5/8" (15.9)	18.6	19.1	
3/4" (19)	22.9	23.3	

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

5.2.7 Drill holes if the pipes need to pass the wall.

5.2.8 According to the field condition to bend the pipes so that it can pass the wall smoothly.

5.2.9 Bind and wrap the wire together with the insulated pipe if necessary.

5.2.10 Set the wall conduit

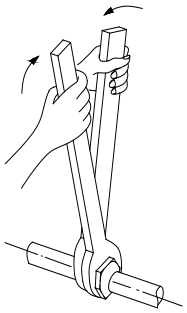
5.2.11 Set the supporter for the pipe.

5.2.12 Locate the pipe and fix it by supporter

- For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

5.2.13 Connect the pipe to indoor unit and outdoor unit by using two spanners.

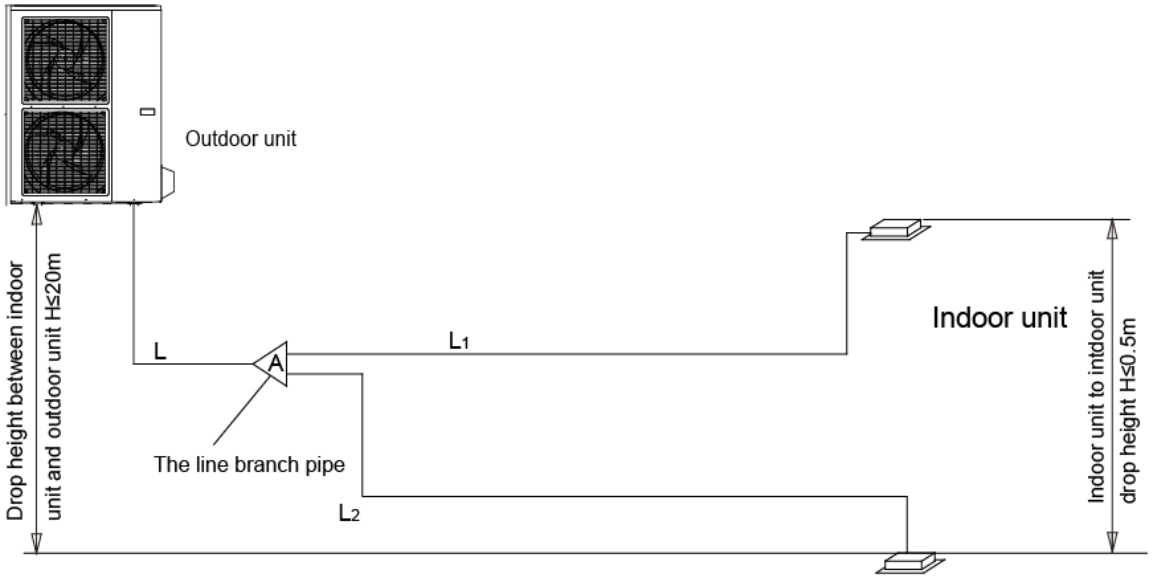
- Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

Pipe Diameter	Torque		Sketch map
	(kgf.cm)	(N.cm)	
1/4" (6.35)	144~176	1420~1720	
3/8" (9.52)	333~407	3270~3990	
1/2" (12.7)	504~616	4950~6030	
5/8" (15.9)	630~770	6180~7540	
3/4" (19)	990~1210	9270~11860	

5.3 For Units with Twins Function

5.3.1 Length and drop height permitted of the refrigerant piping

Note: Reduced length of the branching tube is the 0.5m of the equivalent length of the pipe.



Note: All used branch pipe must be produced by Midea, otherwise it causes malfunction.
The indoor units should be installed equivalently at the both side of the U type branch pipe.

		Permitted Value		Piping
Pipe Length	Total pipe length (Actual)	18K+18K	30m	L+L1+L2
		24K+24K	50m	
		30K+30K	50m	
	Max. branch pipe length		15m	L1, L2
	Max. branch pipe length difference		10m	L1-L2
Drop Height	Max. height difference between indoor unit and outdoor unit		20m	H1
	Max. height difference between indoor units		0.5m	H2

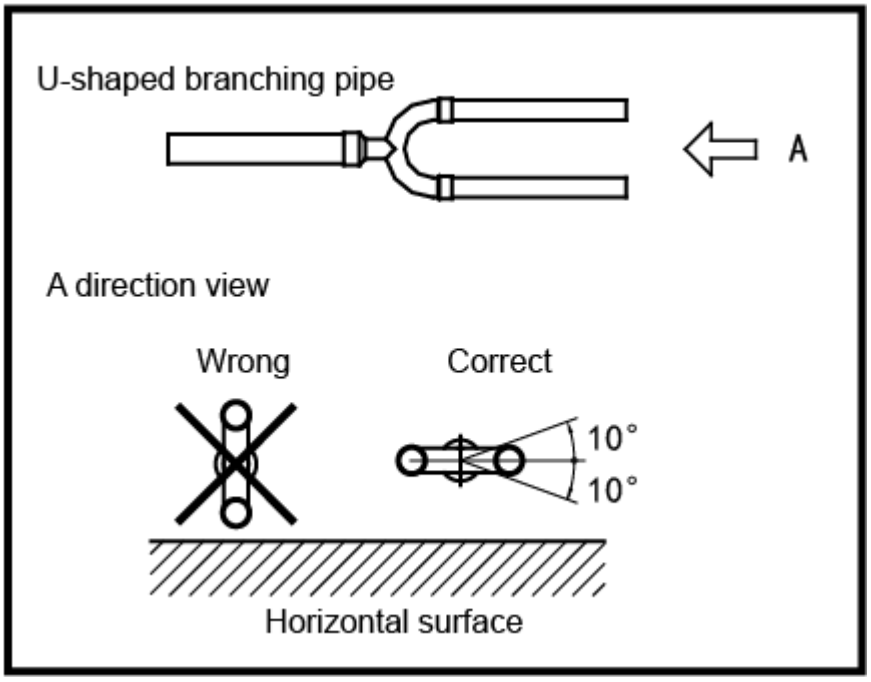
5.3.2 Size of joint pipes for indoor unit (R410a)

Capacity of indoor unit (A)	Size of main pipe(mm)		
	Gas side	Liquid side	Available branching pipe
18K	Φ12.7	Φ6.35	CE-FQZHN-01C
24K	Φ15.9	Φ9.5	CE-FQZHN-01C
30K	Φ15.9	Φ9.5	CE-FQZHN-01C

5.3.3 Size of joint pipes for outdoor unit (R410a)

Model	the size of main pipe(mm)		
	Gas side	Liquid side	The 1st branching pipe
36K	Φ15.9	Φ9.5	CE-FQZHN-01C
48K	Φ15.9	Φ9.5	CE-FQZHN-01C
60K	Φ15.9	Φ9.5	CE-FQZHN-01C

5.3.4 The branching pipe must be installed horizontally, error angle of it should not large than 10°. Otherwise, malfunction will be caused.



6. Drainage pipe installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

6.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

6.2 Key points of drainage water pipe installation

6.2.1 Considering the pipeline route and elevation

- Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.

6.2.2 Drainage pipe selection

- The drainage pipe diameter shall not small than the drain hose of indoor unit
- According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

Capacity (x1000Btu)	Water flowrate (l/h)
12	2.4
18	4
24	6
30	7
36	8
42	10
48	12
60	14

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)		Remark
		Slope 1/50	Slope 1/100	
PVC25	20	39	27	For branch pipe
PVC32	25	70	50	
PVC40	31	125	88	Could be used for confluence pipe
PVC50	40	247	175	
PVC63	51	473	334	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)	Remark
PVC25	20	220	For branch pipe
PVC32	25	410	
PVC40	31	730	Could be used for confluence pipe
PVC50	40	1440	
PVC63	51	2760	
PVC75	67	5710	
PVC90	77	8280	

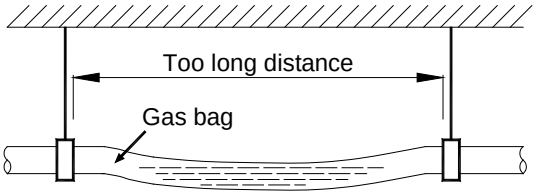
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

6.2.3 Individual design of drainage pipe system

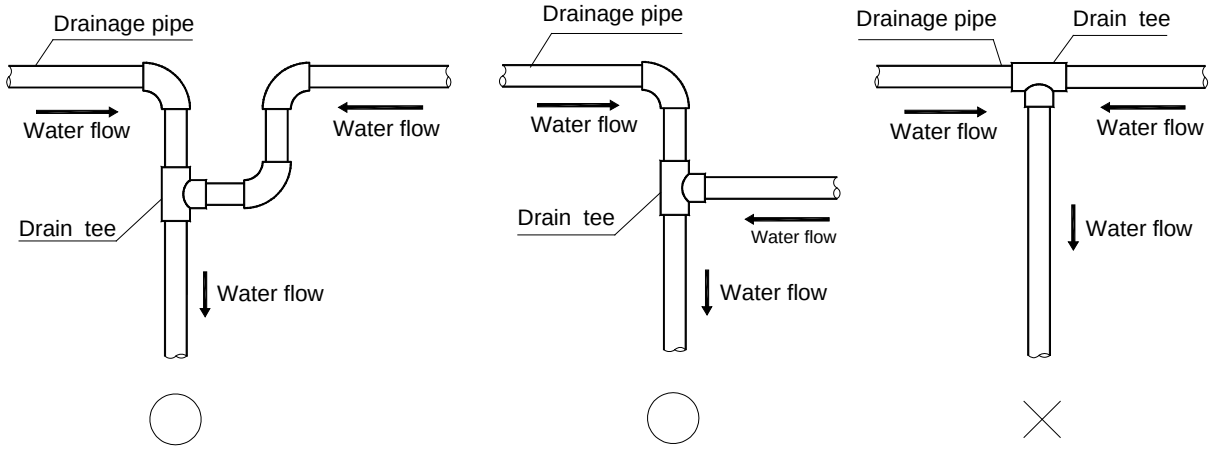
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

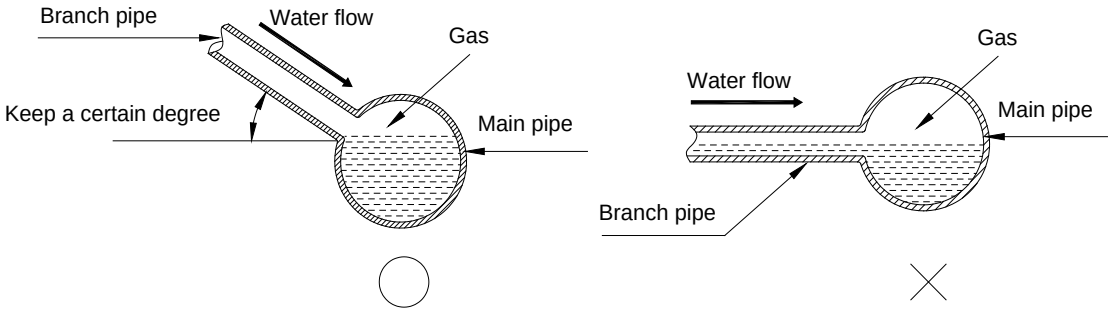
6.2.4 Supporter gap of drainage pipe

- In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m and 1.5m~2.0m.
- Each vertical pipe shall be equipped with not less than two hangers.
- Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



6.2.5 The horizontal pipe layout should avoid converse flow or bad flow

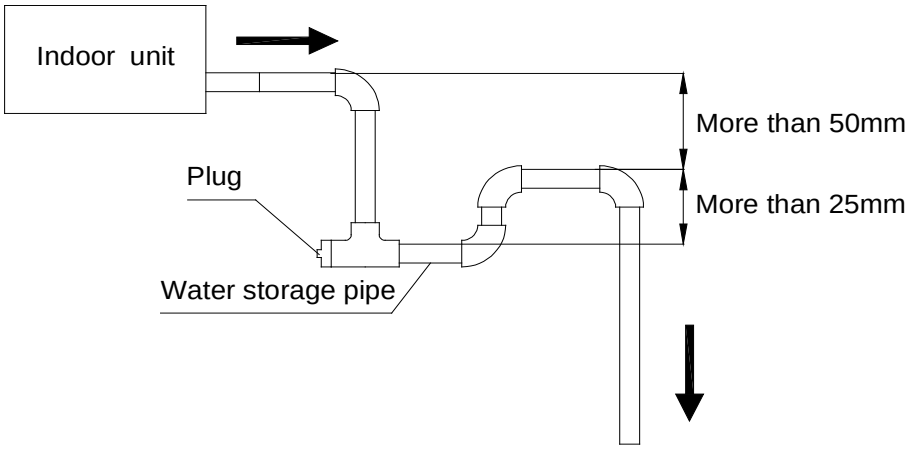




- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

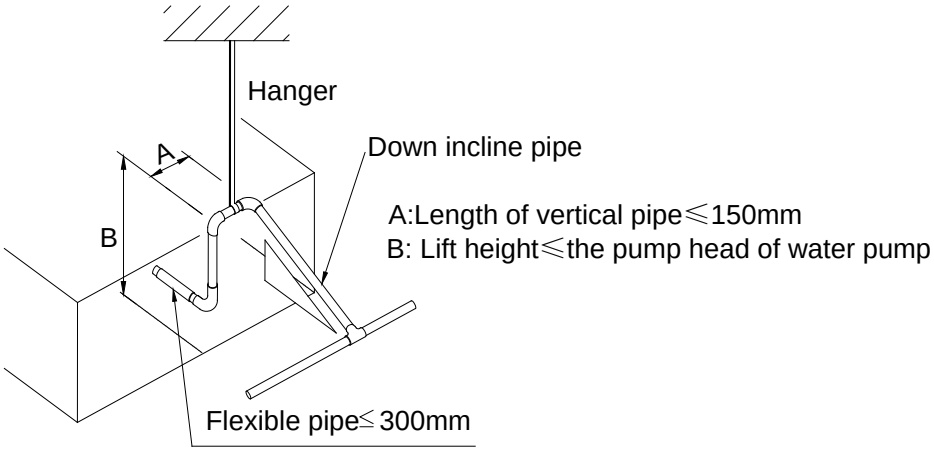
6.2.6 Water storage pipe setting

- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit , the water storage pipe should be set to avoid converse flow or blow water phenomena.



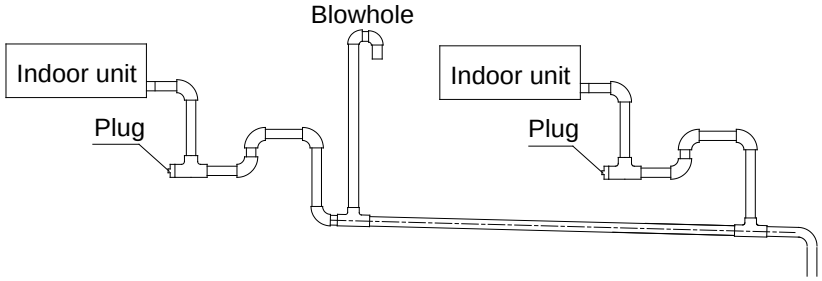
6.2.7 Lifting pipe setting of indoor unit with water pump

- The length of lifting pipe should not exceed the pump head of indoor unit water pump.
  Pump head of big four way cassette: 750mm
  Pump head of compact four way cassette: 500mm
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.
- Refer the following picture for installation reference.



6.2.8 Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.
- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



6.2.9 The end of drainage pipe shall not contact with ground directly.

6.3 Drainage test

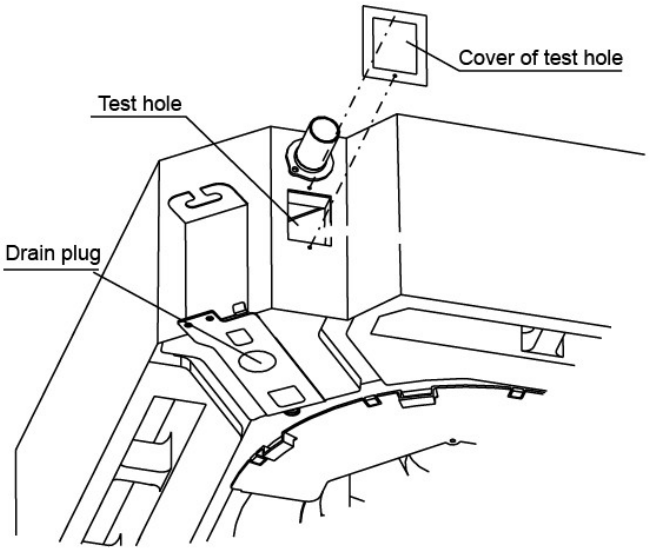
6.3.1 Water leakage test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

6.3.2 Water discharge test

1. Natural drainage mode(the indoor unit with outdoor drainage pump)
   Infuse above 600ml water through water test hole slowly into the water collector, observe whether the water can discharge through the transparent hard pipe at drainage outlet.
2. Pump drainage mode

2.1 Disconnect the plug of water level switch, remove the cover of water test hole and slowly infuse about 2000ml water through the water test hole, be sure that the water will not touch the motor of drainage pump.



2.2 Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then connect the plug of water level switch, check the operation sound of water pump and observe whether the water can discharge through the transparent hard pipe at drainage outlet. (In light of the length of drainage pipe, water shall be discharged about 1 minute delayed)

2.3 Stop the operation of air conditioner, power off the power supply and put the cover of water test hole back to the original place.

a. After stopped the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water collector.

b. Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

6.4 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

7. Vacuum Drying and Leakage Checking

7.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

7.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

7.3.1 Ordinary vacuum drying

1. When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).
2 If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.
3 If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.
4 Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7.3.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

1. Finding moisture during flushing refrigerant pipe.
2. Conducting construction on rainy day, because rain water might penetrated into pipeline.
3. Construction period is long, and rain water might penetrated into pipeline.
4. Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

1. Vacuum drying for 1 hour.
2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm2 .
   Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.
3. Vacuum drying again for half an hour.
   If the pressure reached -755mmHg, start to pressure leakage test. If it can not reached the value, repeat vacuum damage and vacuum drying again for 1 hour.
4 Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

8. Additional refrigerant charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Φ6.35	Φ9.52	Φ12.7
Formula	V=11g/m×(L-5)	V=30g/m×(L-5)	V=60g/m×(L-5)

V: Additional refrigerant charge volume (g).
L : The length of the liquid pipe (m).

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

9. Engineering of insulation

9.1 Insulation of refrigerant pipe

9.1.1 Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection→ vacuum drying → insulate the joint parts

9.1.2 Purpose of refrigerant pipe insulation

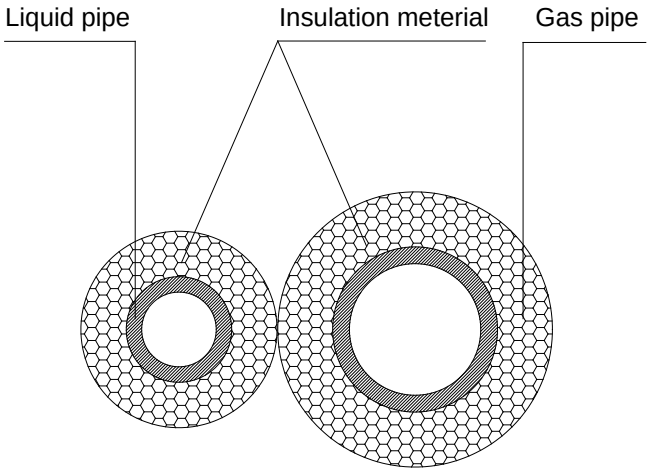
- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100℃) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

9.1.3 Insulation material selection for refrigerant pipe

- The burning performance should over 120℃
- According to the local law to choose insulation materials
- The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

9.1.4 Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together
- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

9.2 Insulation of drainage pipe

9.2.1 Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection→ drainage test→ insulate the joint parts

9.2.2 Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and

cause leakage to damage the house decoration.

9.2.3 Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

9.2.4 Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

10. Engineering of electrical wiring

10.1 Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.
- According to table in indoor part named “the specification of the power” to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.

11. Test operation

11.1 The test operation must be carried out after the entire installation has been completed.

11.2 Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop values are both opened.
- The air conditioner is pre-heated by turning on the power.

11.3 Test operation

Set the air conditioner under the mode of "COOLING" by remote controller, and check the following points.

Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

Part 5
Electrical Control System

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2. Troubleshooting 88

3. Controller 117

1. Electrical Control Function

1.1 Definition

T1: Indoor room temperature

T2: Coil temperature of indoor heat exchanger middle.

T2B: Coil temperature of indoor heat exchanger outlet.

T3: Coil temperature of condenser

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

1.2 Main Protection

1.2.1 Time delay at restart for compressor.

1.2.2 Temperature protection of compressor top

The unit will stop working when the compressor top temp. protector cut off, and will restart after the compressor top temp. protector restart.

1.2.3 Temperature protection of compressor discharge

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

----If 102℃<T5<115℃, decrease the frequency to the lower level every 2 minutes till to F1.

---If T5>115℃ for 10 seconds, the compressor will stop and restart till T5<90℃.

1.2.4 Sensor protection at open circuit and breaking disconnection.

1.2.5 Indoor fan delayed open function

When the unit starts up, the louver will be active immediately and the indoor fan will open 10s later.

If the unit runs in heating mode, the indoor fan will be also controlled by anti-cold wind function.

1.2.6 Fan Speed is out of control

When Indoor Fan Speed keeps too low (For A5 duct,300RPM,For Super slim cassette,200RPM) for 50s, the unit will stop and the LED will display the failure

1.3 Operation Modes and Functions

1.3.1 Fan mode

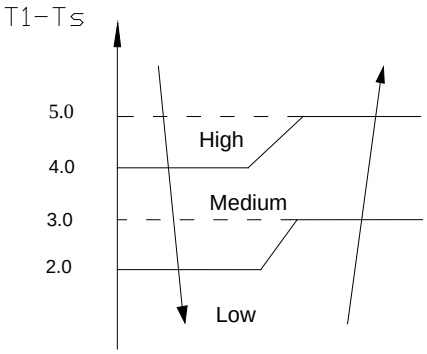
(1) Outdoor fan and compressor stop.

(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/(med)/low/auto.

(4) The louver operates same as in cooling mode.

(5) Auto fan:



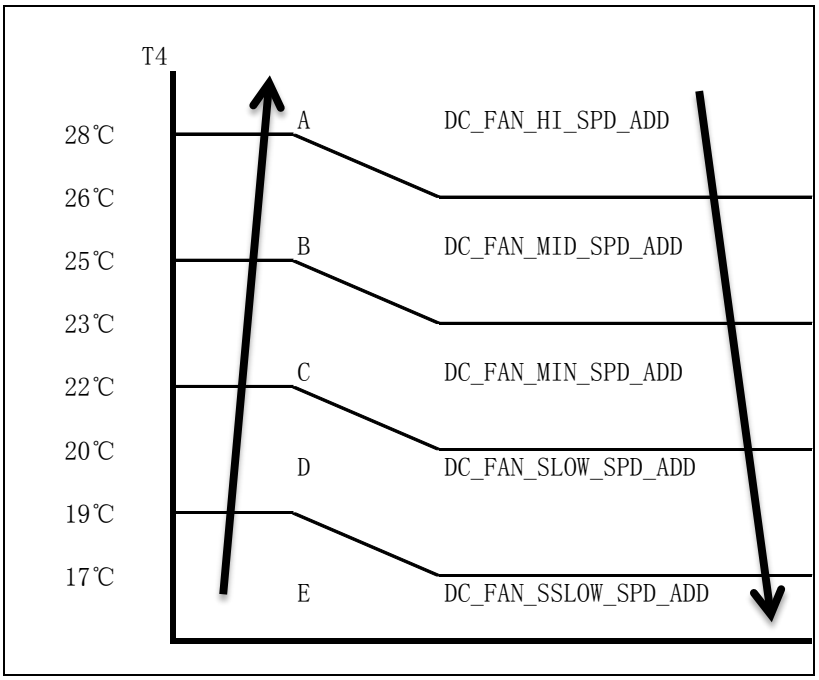
Ts=24

1.3.2 Cooling Mode

1.3.2.1 Outdoor PMW open angle control

The unit is working in cooling mode with the EXV open 300P for 3 minutes, then adjusting PMW open angle according to the temperature of compressor discharge every 2 minutes.

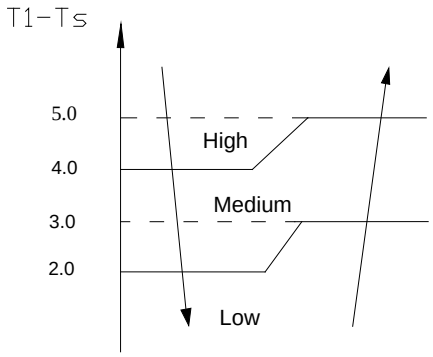
1.3.2.2 Outdoor fan running rules



1.3.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

The auto fan:



1.3.2.4 Evaporator low temperature T2 protection.

When T2<2℃and lasts for 3 minutes, the indoor has no capacity demand and resume till T2≥7℃.

1.3.2.5 Condenser high temperature T3 protection

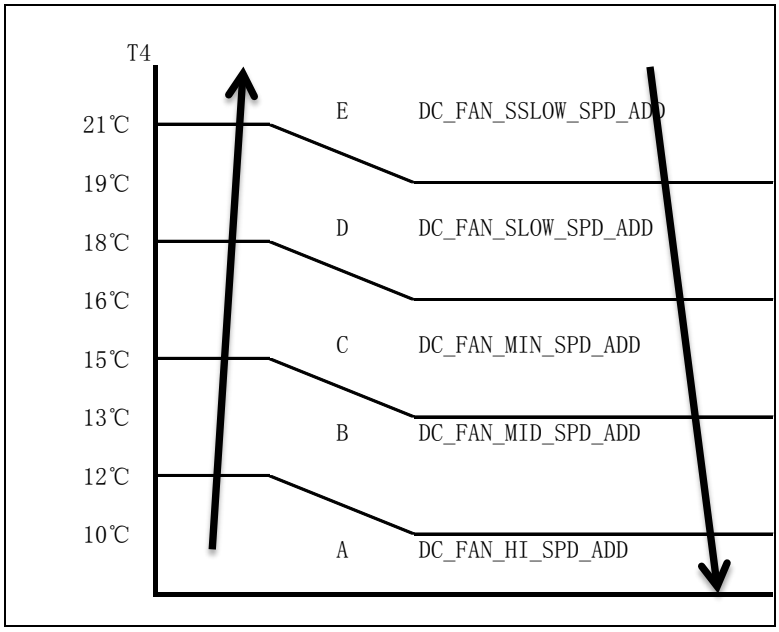
When T3≥65℃ for 3 seconds, the compressor will shut off. When T3＜52,the compressor will restart.

1.3.3 Heating Mode

1.3.2.1 Outdoor PMW open angle control

The unit is working in heating mode with the EXV open 300P for 3 minutes, then adjusting PMW open angle according to the temperature of compressor discharge every 2 minutes.

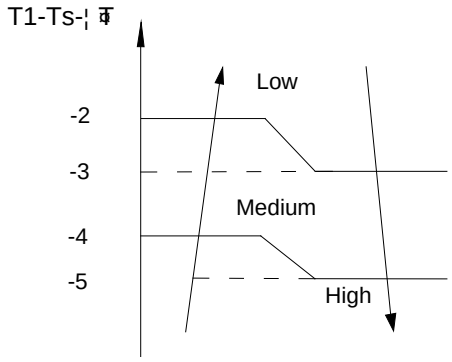
1.3.3.2 Outdoor fan running rules:



1.3.3.3 Indoor fan running rules:

When the compressor is on, the indoor fan can be set to high/(med)/low/auto. And the anti-cold wind function has the priority.

Auto fan action:



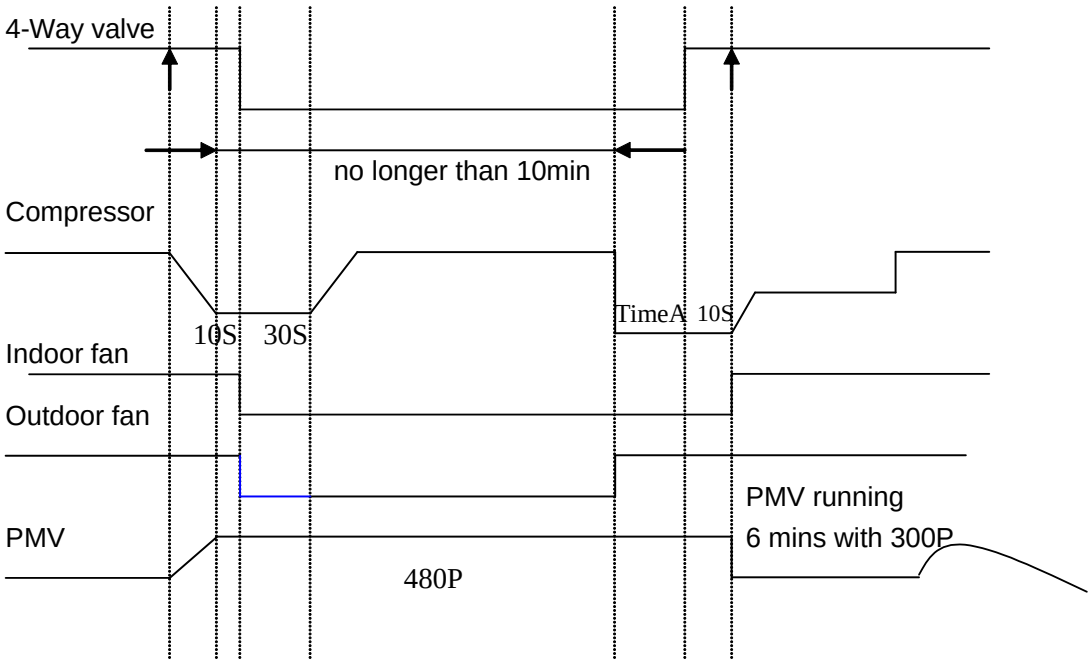
1.3.3.4 Defrosting mode：

For 24-36K models:

Condition of defrosting:

T3≤TempEnterDefrost_ADD ℃ and lasts for 40 minutes.

Defrosting action：



Condition of ending defrosting:

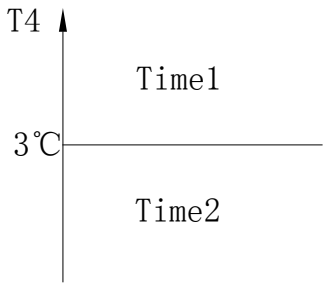
If any one of following items is satisfied, defrosting will stop and the machine will turn to normal heating mode.

① T3 > TempQuitDefrost_ADD ℃;

②The defrosting time achieves 10min.

For 48K model:

Condition of defrosting:

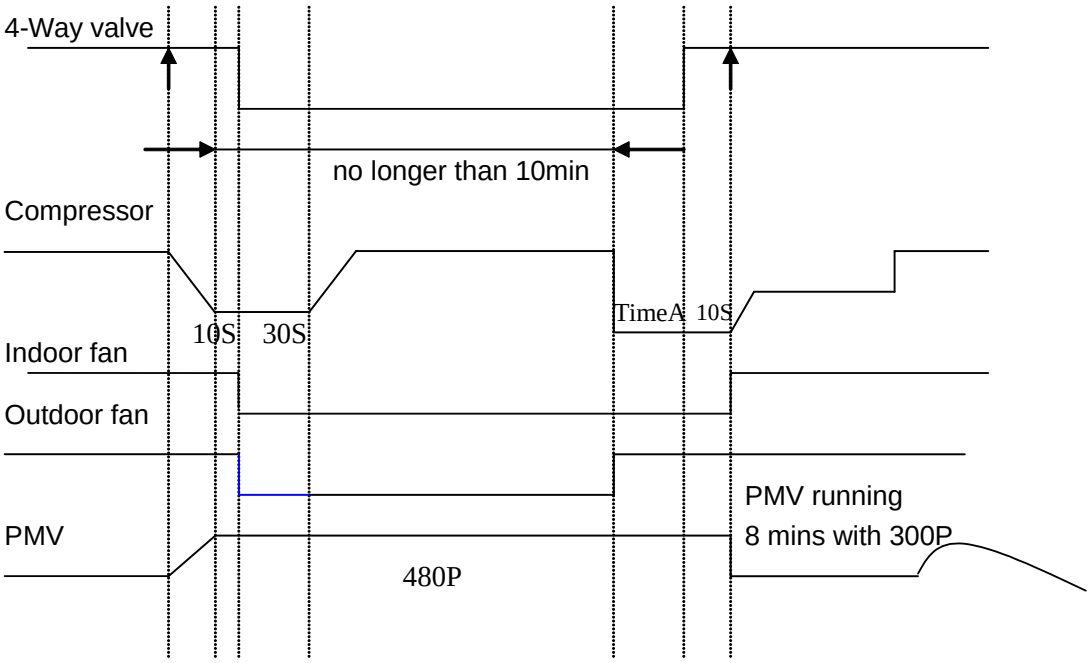


Time conditions:
time1
Time conditions(Meet the following conditions)
1.Running in heating mode
2. T4≥3℃
3. Compressor is on
4. T3≤TempEnterDefrost_ADD ℃
Cleared conditions (Meet any one of the following conditions)
1. Compressor is off.
2. T3＞TempEnterDefrost_ADD ℃

Time2
Time conditions(Meet the following conditions)
1.Running in heating mode
2. T4<3℃
3. Compressor is on
4. T3≤TempEnterDefrost_ADD ℃

Cleared conditions (Meet any one of the following conditions)
1. Compressor is off and T3＞TempEnterDefrost_ADD +2 ℃ or run for 20 minutes
2. Running in cooling mode.
3. Compressor is off for 1 hour.

Condition of entry defrosting:
time1+ time2≥40 minutes, When defrosting is end,time1 and time2 are cleared.
Defrosting action：



Condition of ending defrosting:

If any one of following items is satisfied, defrosting will stop and the machine will turn to normal heating mode.

① The defrosting time achieves 10min;

② T3 ≥15℃;

③ T3 ≥7℃ for 60seconds.

1.3.3.5 High evaporator coil temp.T2 protection:

T2>60℃, the compressor will stop and restart when T2<54℃.

1.3.4 Auto-mode

This mode can be chosen with remote controller and the setting temperature can be changed between 17~30℃.

In auto mode, the machine will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

ΔT=T1-Ts	Running mode
ΔT≥2℃	Cooling
-1≤ΔT<2℃	Fan-only
ΔT<-1℃	Heating

Indoor fan will run at auto fan of the relevant mode.

The louver operates same as in relevant mode.

If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose mode according to T1-Ts.

If the setting temperature is modified, the machine will choose running function again.

1.3.5 Drying mode

Drying mode works the same as cooling mode in low speed.

All protections are active and the same as that in cooling mode.

1.3.6 Timer function

1.3.6.1 Timing range is 24 hours.

1.3.6.2 Timer on. The machine will turn on automatically when reaching the setting time.

1.3.6.3 Timer off. The machine will turn off automatically when reaching the setting time.

1.3.6.4 Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.

1.3.6.5 Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.

1.3.6.6 The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the “timer off” function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.

1.3.6.7 The setting time is relative time.

1.3.7 Economy function

1.3.7.1 The sleep function is available in cooling, heating or auto mode.

1.3.7.2. Operation process in sleep mode is as follow:

When cooling, the setting temperature rises 1℃ (be lower than 30℃) every one hour, 2 hours later the setting temperature stops rising and the indoor fan is fixed at low speed.

When heating, the setting temperature decreases 1℃ (be higher than 17℃) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed at low speed. (Anti-cold wind function has the priority).

1.3.7.3 Operation time in sleep mode is 7 hours. After 7 hours the AC quits this mode but doesn’t turns off

1.3.7.4 Timer setting is available

1.3.8 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including Swing function) automatically after 3 minutes when power returns.

1.3.9 Drain pump control (For duct & Cassette)

For 12k models:

Adopt the water-level switch to control the action of drain pump.

Main action under different condition :(every 5 seconds the system will check the water level one time)

1. When the A/C operates with cooling (including auto cooling) and forced cooling mode, the pump will start running immediately and continuously, till stop cooling.

2. Once the water level increase and up to the control point, LED will alarm and the drain pump open and continue checking the water level. If the water level fall down and LED disalarmed (drain pump delay close 1 minute) and operate with the last mode. Otherwise the entire system stop operating (including the pump) and LED remain alarming after 3 minutes,

1.3.10 Point Check Function

There is a check switch in outdoor PCB.

Press the switch SW1 to check the states of unit when the unit is running.

Press the switch N times it will display the content corresponding to No. N. After getting into the check function, it will display No. N with 1.5s, meanwhile the low bit decimal of digit display flashing, indicated to get into the check function display. After 1.5s, it will display the content corresponding to No. N.

the digital display tube will display the follow procedure when push SW1 each time.

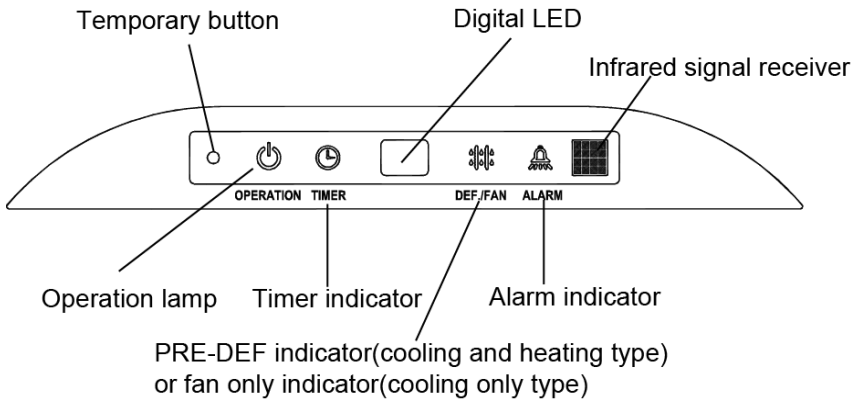
N	Display	Remark		
00	Normal display	Display running frequency, running state or malfunction code		
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “5.0”,it means the capacity demand is 15. the digital display tube show “60”,it means the capacity demand is 6.0)		
02	Amendatory capacity demand code			
03	The frequency after the capacity requirement transfer			
04	The frequency after the frequency limit			
05	The frequency of sending to 341			
06	Indoor unit evaporator outlet temp.(T2)	If the temp. is lower than 0 degree, the digital display tube will show “0”.If the temp. is higher than 70 degree, the digital display tube will show “70”.		
07	Condenser pipe temp.(T3)	If the temp. is lower than -9 degree, the digital display tube will show “-9”.If the temp. is higher than 70 degree, the digital display tube will show “70”. If the indoor unit is not connected, the digital display tube will show: “——”		
08	Outdoor ambient temp.(T4)			
09	Compressor discharge temp.(Tp)	The display value is between 30~120 degree. If the temp. is lower than 30 degree, the digital display tube will show “30”.If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “0.5”,it means the compressor discharge temp. is 105 degree. the digital display tube show “1.6”,it means the compressor discharge temp. is 116 degree)		
10	AD value of current	The display value is hex number.		
11	AD value of voltage			
12	Indoor unit running mode code	Off:0, Fan only 1,Cooling:2, Heating:3, Forced cooling:4		
13	Outdoor unit running mode code			
14	EXV open angle	Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. For example ,the digital display tube show “2.0”,it means the EXV open angle is 120×4=480p.)		
15	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is hex number. For example, the digital display tube show 2A,then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4,T3 and current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by Tp.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	
16	DC fan motor speed			
17	IGBT radiator temp.(Reserved)	The display value is between 13~120 degree. If the temp. is lower than 13 degree, the digital display tube will show “13”.If the temp. is higher than 99 degree, the digital display tube will		

		show single digit and tens digit. (For example, the digital display tube show “0.5”,it means the IGBT radiator temp. is 105 degree. the digital display tube show “1.6”,it means the IGBT radiator temp. is 116 degree)
18	Indoor unit number	The indoor unit can communicate with outdoor unit well.
19	Condenser pipe temp. of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show “0”.If the temp. is higher than 70 degree, the digital display tube will show “70”. If the capacity demand is 0, , the digital display tube will show “0. If the indoor unit is not connected, the digital display tube will show: “——”
20	Condenser pipe temp. of 2# indoor unit	
21	Condenser pipe temp. of 3# indoor unit	
22	1# Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show “5.0”,it means the capacity demand is 15. the digital display tube show “60”,it means the capacity demand is 6.0). If the indoor unit is not connected, the digital display tube will show: “——”
23	2# Indoor unit capacity demand code	
24	3# Indoor unit capacity demand code	

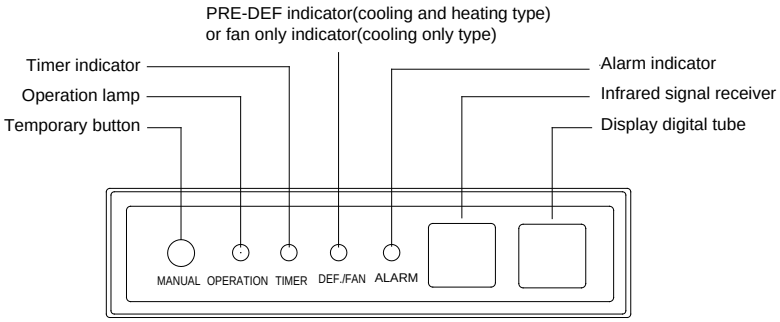
2. Troubleshooting

2.1 Display board

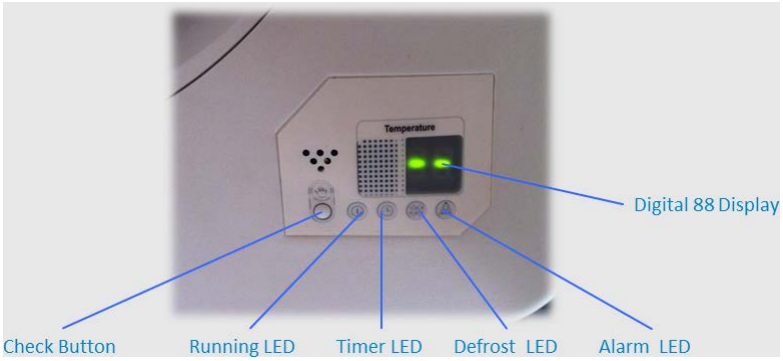
2.1.1 Icon explanation on indoor display board (Super slim cassette).



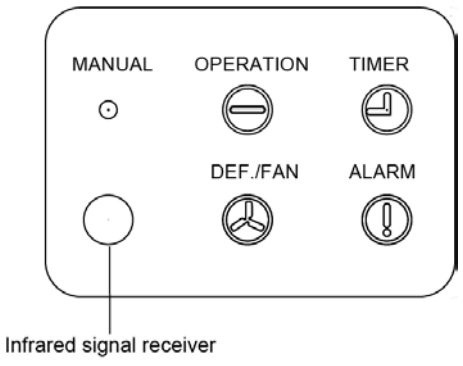
2.1.2 Icon explanation on indoor display board (A5 Duct)



2.1.3 Display board of Up-down 4-way Panel



2.1.4 Display board of Ceiling-floor indoor unit



2.2 Indoor unit malfunction

NO.	Malfunction	Running lamp	Timer lamp	Defrosting lamp	Alarm lamp	Display(digital tube)
1	Communication malfunction between indoor and outdoor units.	X	☆	X	X	E1
2	Open or short circuit of T1 temperature sensor	☆	X	X	X	E2
3	Open or short circuit of T2 temperature sensor	☆	X	X	X	E3
4	Open or short circuit of T2B temperature sensor	☆	X	X	X	E4
5	Full-water malfunction	X	X	X	☆	EE
6	Indoor EEPROM malfunction	◎	X	X	X	E7
7	Outdoor unit malfunction	X	X	X	◎	Ed
8	Indoor fan speed is out of control	☆	☆	X	X	E8
9	Communication malfunction between main PCB and up-down panel PCB	☆	☆	☆	X	F0
10	Up-down panel malfunction	☆	☆	X	☆	F1
11	Up-down panel is not closed	☆	☆	X	O	F2
12	Communication malfunction between master unit and slave unit	X	☆	X	☆	F3
13	Other malfunction of master unit or slave unit	X	☆	☆	X	F4
O (on) X(off) ☆(flash at 5Hz) ◎(flash at 0.5Hz)						

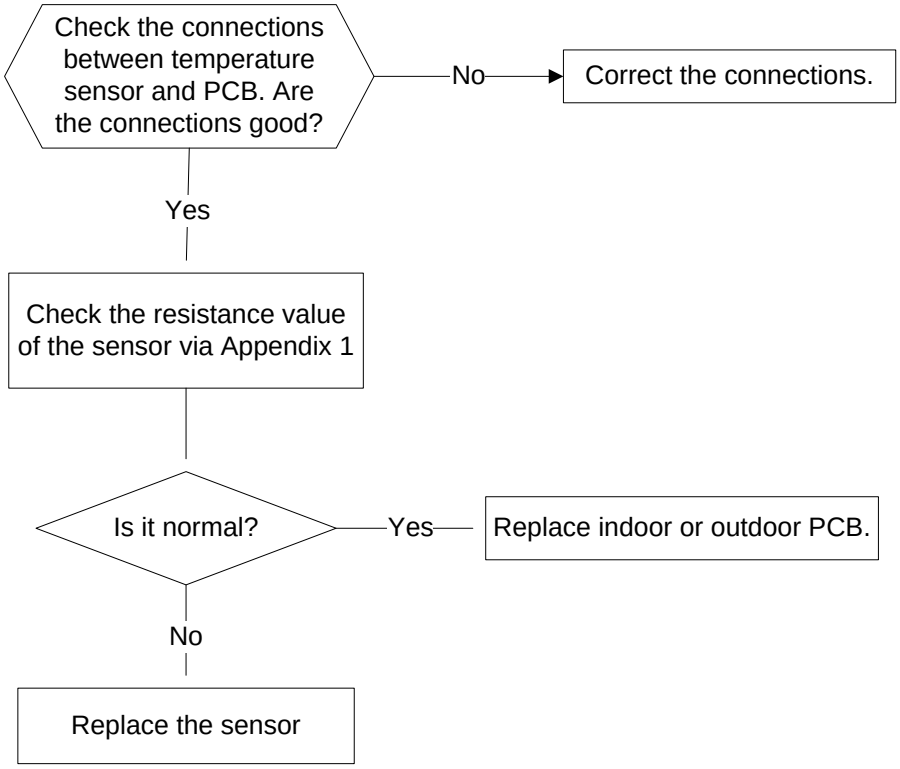
2.3 Outdoor unit malfunction

Display	Malfunction or Protection
E0	Outdoor EEPROM malfunction
E2	Indoor / outdoor units communication error
E3	Communication malfunction between IPM board and outdoor main board
E4	Open or short circuit of T3 or T4 temperature sensor
E5	Voltage protection of compressor
E6	PFC module protection (For 30K-48K)
E8	Outdoor fan speed has been out of control
P0	Top temperature protection of compressor
P1	High pressure protection
P2	Low pressure protection
P3	Current protection of compressor
P4	Discharge temperature protection of compressor
P5	High temperature protection of condenser
P6	IPM module protection
P7	High temperature protection of evaporator

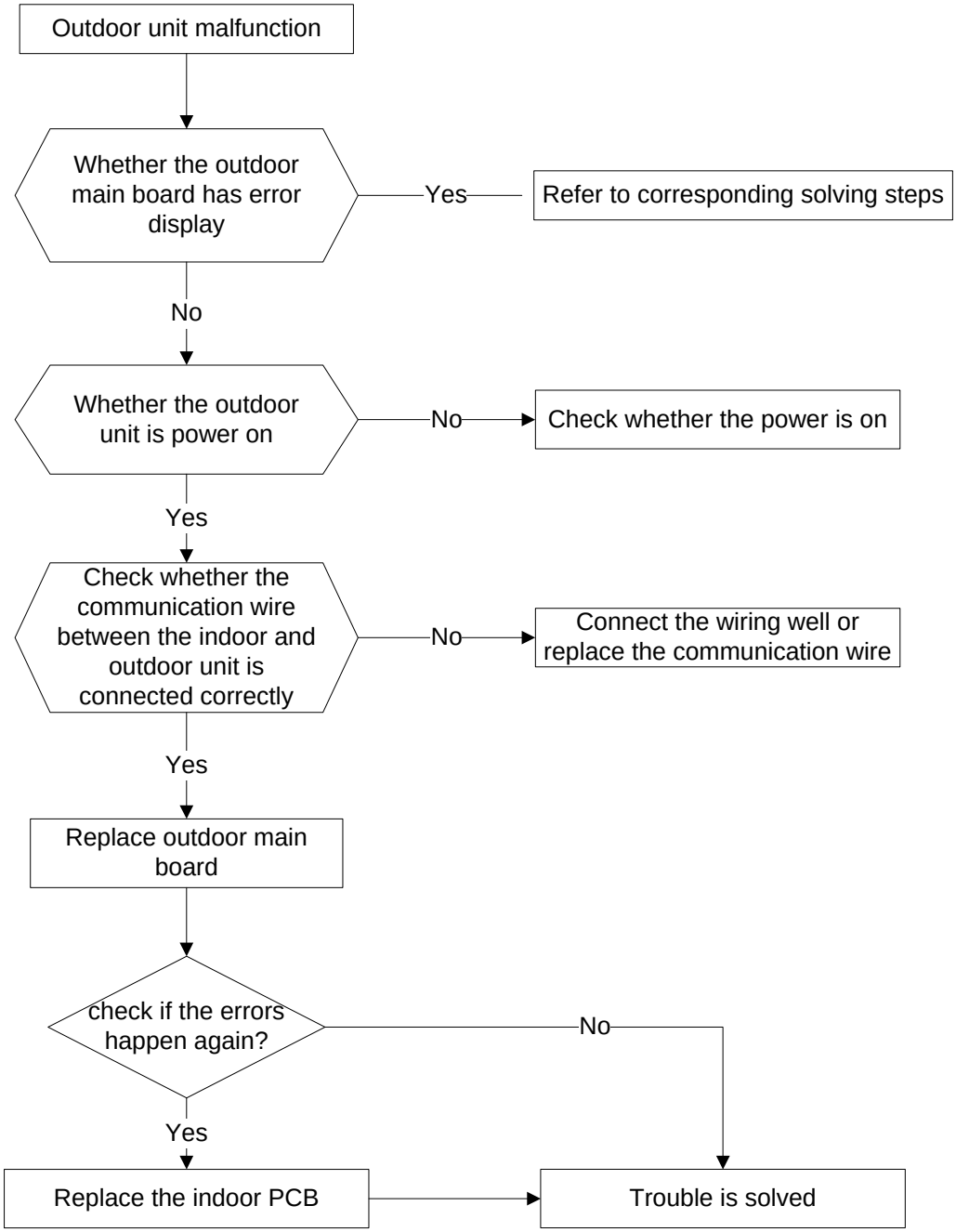
2.4 Solving steps for typical malfunction

2.4.1 For the indoor unit

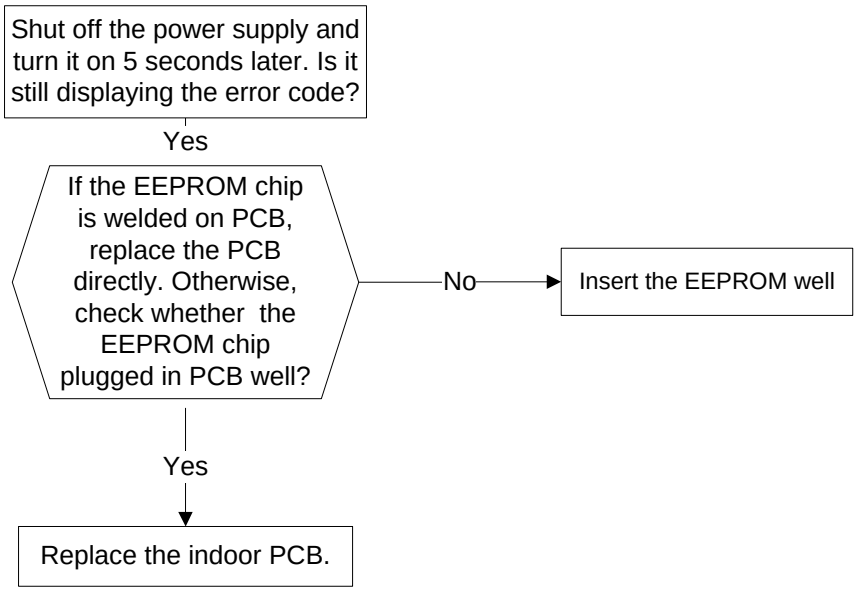
2.4.1.1 Open or short circuit of temperature sensor


Check the connections between temperature sensor and PCB. Are the connections good?
No
Correct the connections.
Yes
Check the resistance value of the sensor via Appendix 1
Is it normal?
Yes
Replace indoor or outdoor PCB.
No
Replace the sensor

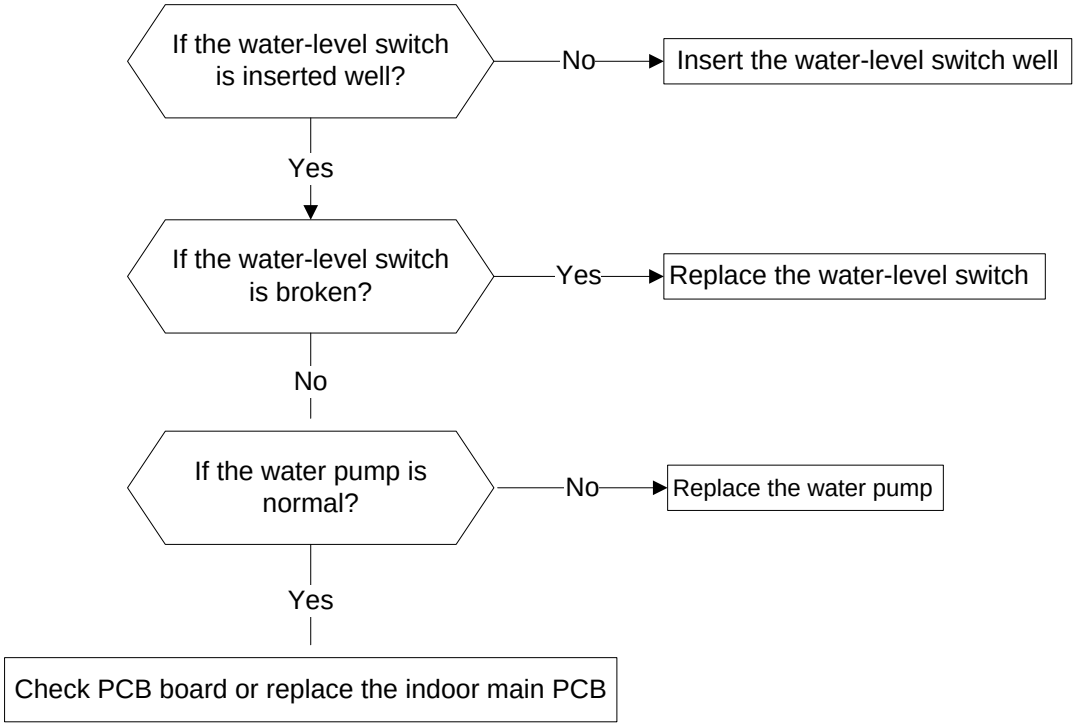
2.4.1.2. Outdoor unit malfunction


Outdoor unit malfunction
Whether the outdoor main board has error display
Yes
Refer to corresponding solving steps
No
Whether the outdoor unit is power on
No
Check whether the power is on
Yes
Check whether the communication wire between the indoor and outdoor unit is connected correctly
No
Connect the wiring well or replace the communication wire
Yes
Replace outdoor main board
check if the errors happen again?
No
Yes
Replace the indoor PCB
Trouble is solved

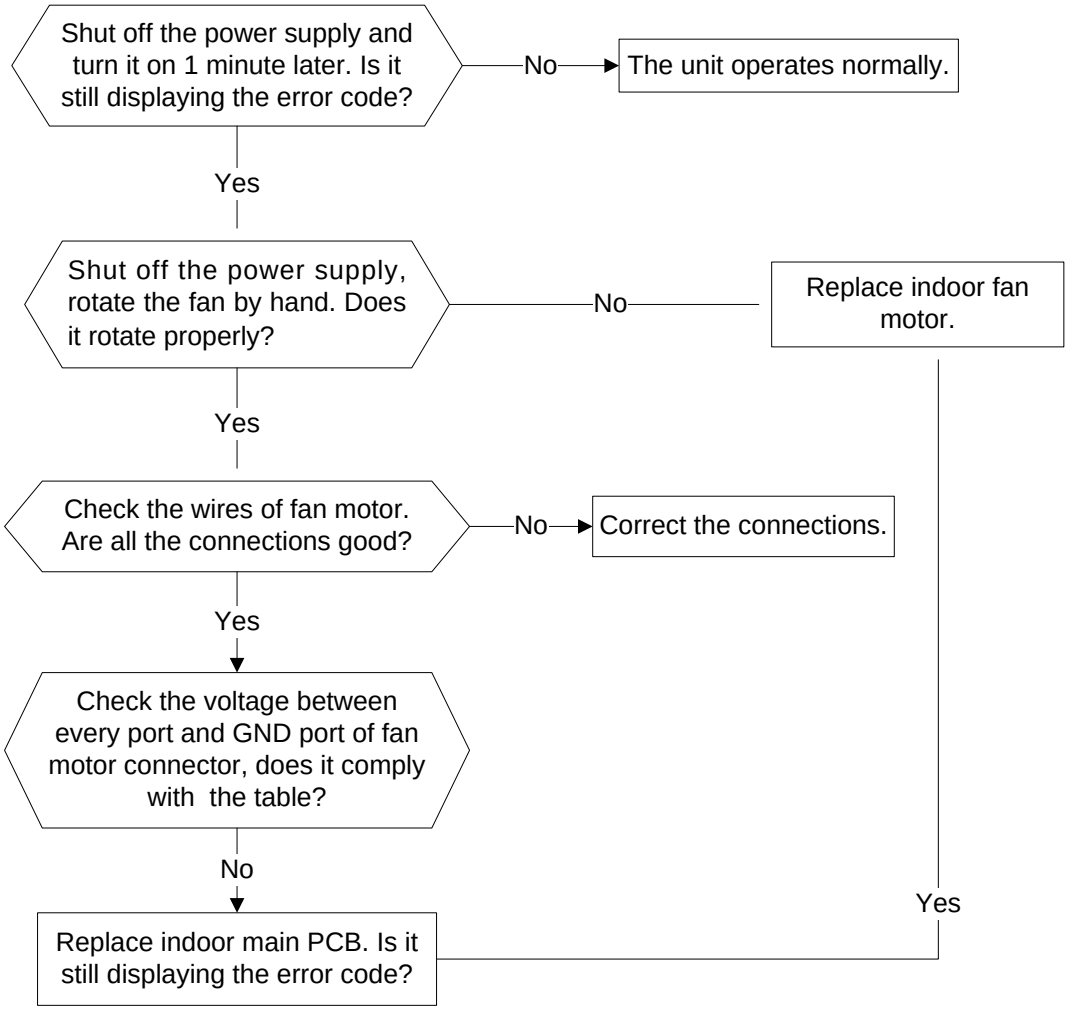
2.4.1.3. Indoor EEPROM malfunction


Shut off the power supply and turn it on 5 seconds later. Is it still displaying the error code?
Yes
If the EEPROM chip is welded on PCB, replace the PCB directly. Otherwise, check whether the EEPROM chip plugged in PCB well?
No
Insert the EEPROM well
Yes
Replace the indoor PCB.

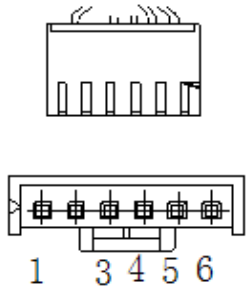
2.4.1.4. Full-water malfunction



2.4.1.5. Indoor fan Speed has been out of control. (Only for the units used DC motor)


Shut off the power supply and turn it on 1 minute later. Is it still displaying the error code?
No
The unit operates normally.
Yes
Shut off the power supply, rotate the fan by hand. Does it rotate properly?
No
Replace indoor fan motor.
Yes
Check the wires of fan motor. Are all the connections good?
No
Correct the connections.
Yes
Check the voltage between every port and GND port of fan motor connector, does it comply with the table?
No
Yes
Replace indoor main PCB. Is it still displaying the error code?

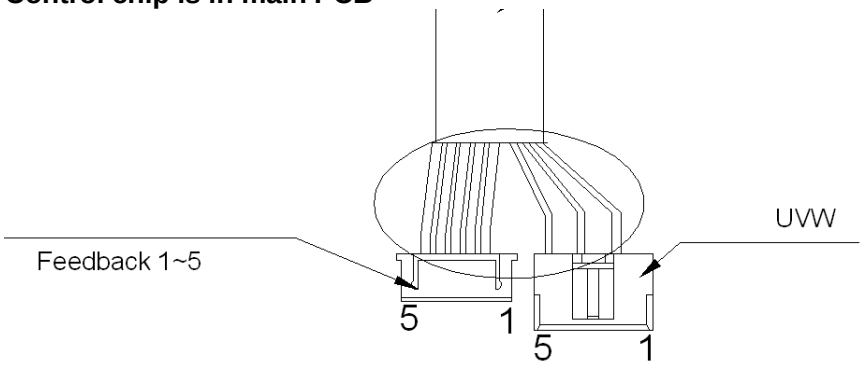
DC motor voltage input and output (control chip is inside the motor)



DC motor voltage input and output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

Control chip is in main PCB



NO.	1	2	3	4	5
Color	Orange	Grey	White	Pink	Black
Signal	Hu	Hv	Hw	Vcc	GND

Color	Red	Blue	Yellow
Signal	W	V	U

1) Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must have problems and need to be replaced. Otherwise, go to step 2.
2) Power on and when the unit is in standby, measure the voltage of pin4-5 in feedback signal connector. If the value is not 5V, change the PCB. Otherwise, go to step 3.
3) Rotate the fan by hand, measure the voltage of pin1-5, pin 2-5 and pin 3-5 in feedback signal connector. If any voltage is not positive voltage fluctuation, the fan motor must have problems and need to be replaced.

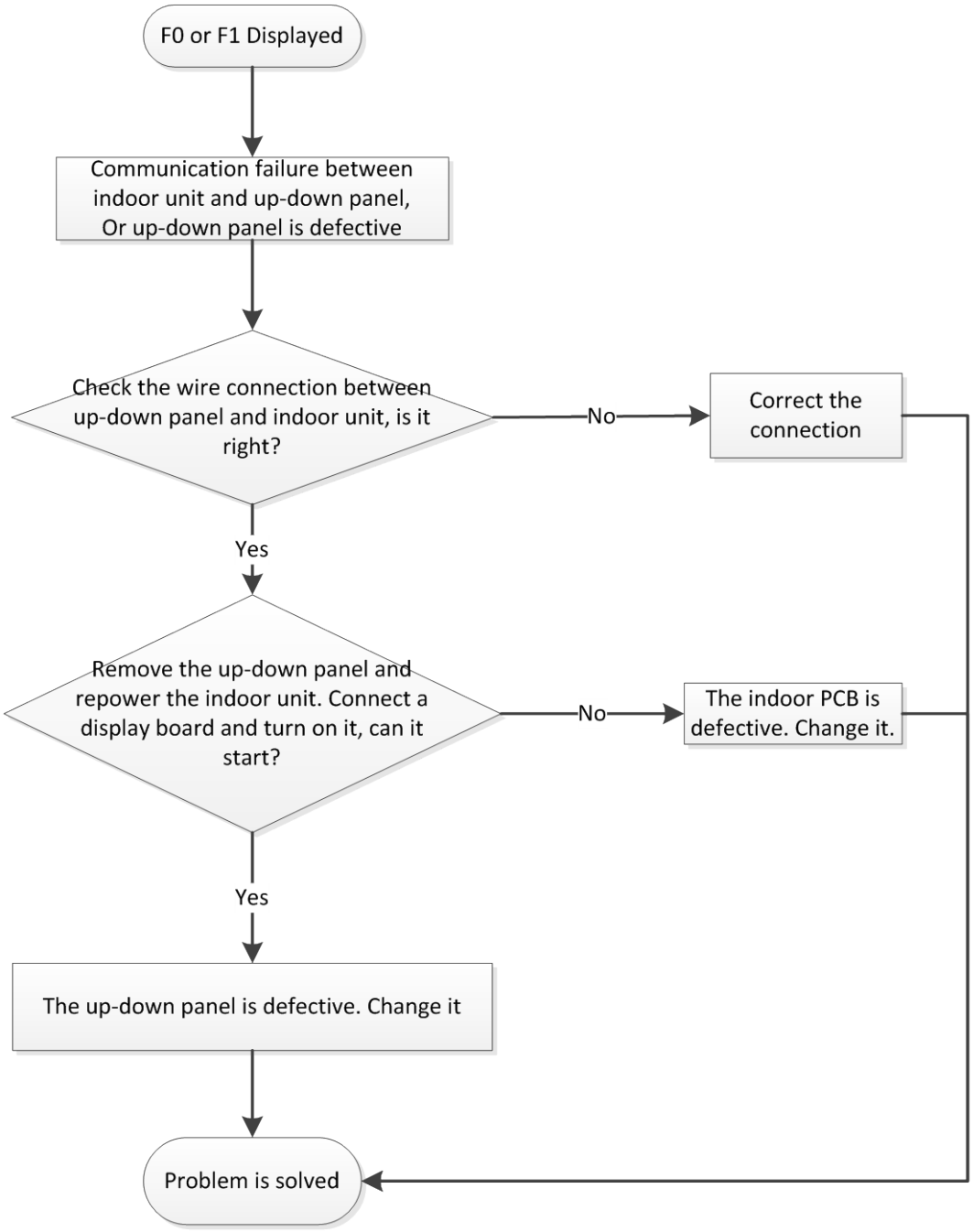
2.4.1.6. **Inverter compressor drive protection (Only for compact cassette 12k & console 12k)**

Refer to the outdoor unit P6 malfunction part to solve this problem.

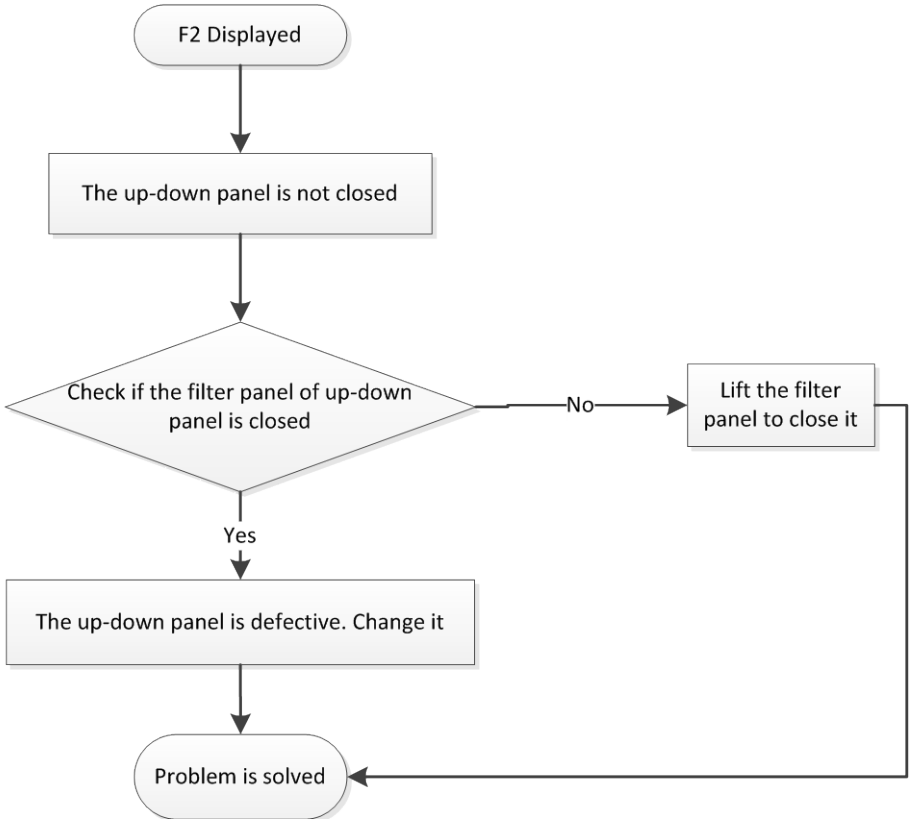
2.4.2 For the super-slim cassette with up-down panel

2.4.2.1 Communication error between indoor unit and up-down panel

2.4.2.2 Up-down panel is defective

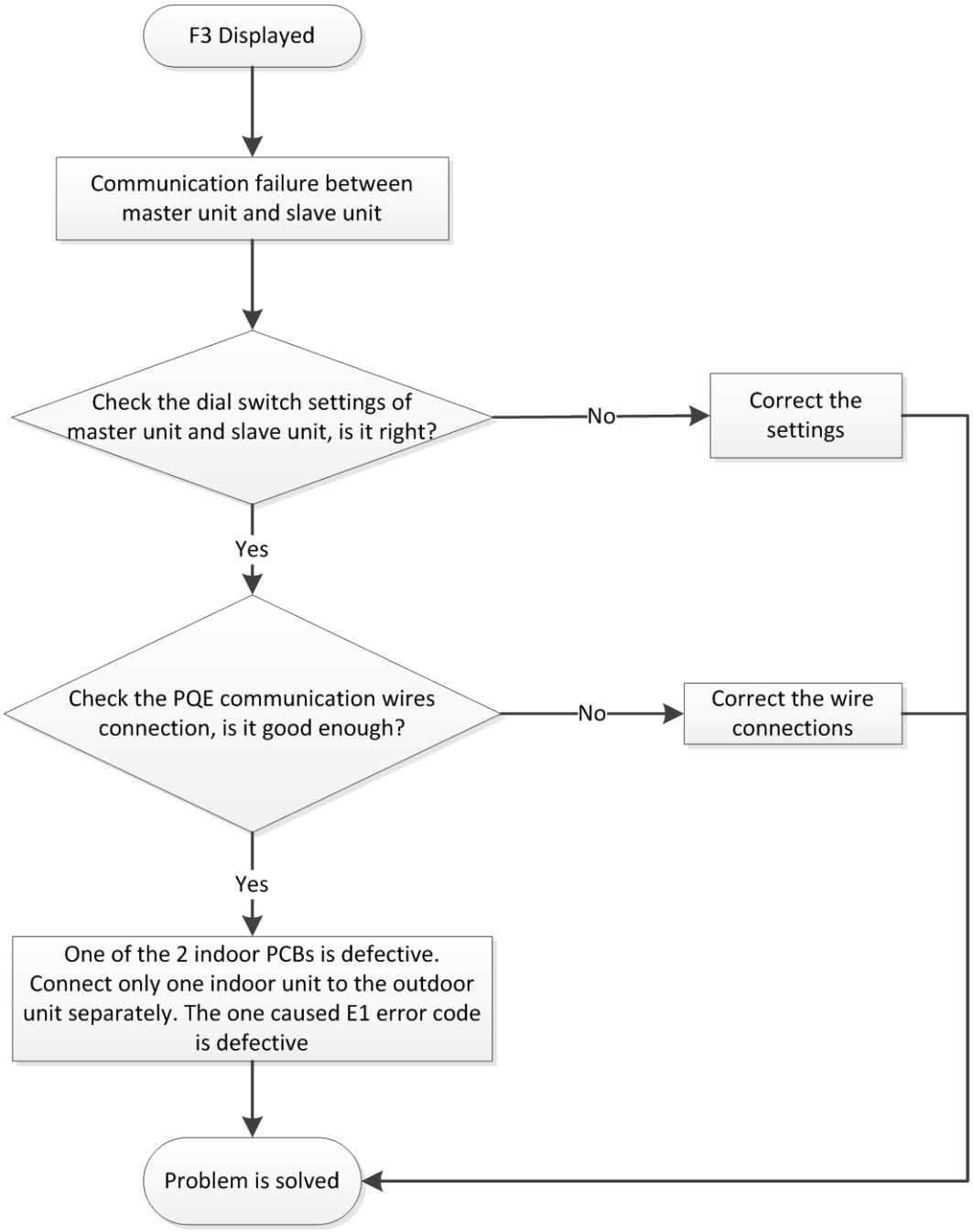

F0 or F1 Displayed
Communication failure between indoor unit and up-down panel, Or up-down panel is defective
Check the wire connection between up-down panel and indoor unit, is it right?
No
Correct the connection
Yes
Remove the up-down panel and repower the indoor unit. Connect a display board and turn on it, can it start?
No
The indoor PCB is defective. Change it.
Yes
The up-down panel is defective. Change it
Problem is solved

2.4.2.3 Up-down panel is not closed


F2 Displayed
The up-down panel is not closed
Check if the filter panel of up-down panel is closed
No
Lift the filter panel to close it
Yes
The up-down panel is defective. Change it
Problem is solved

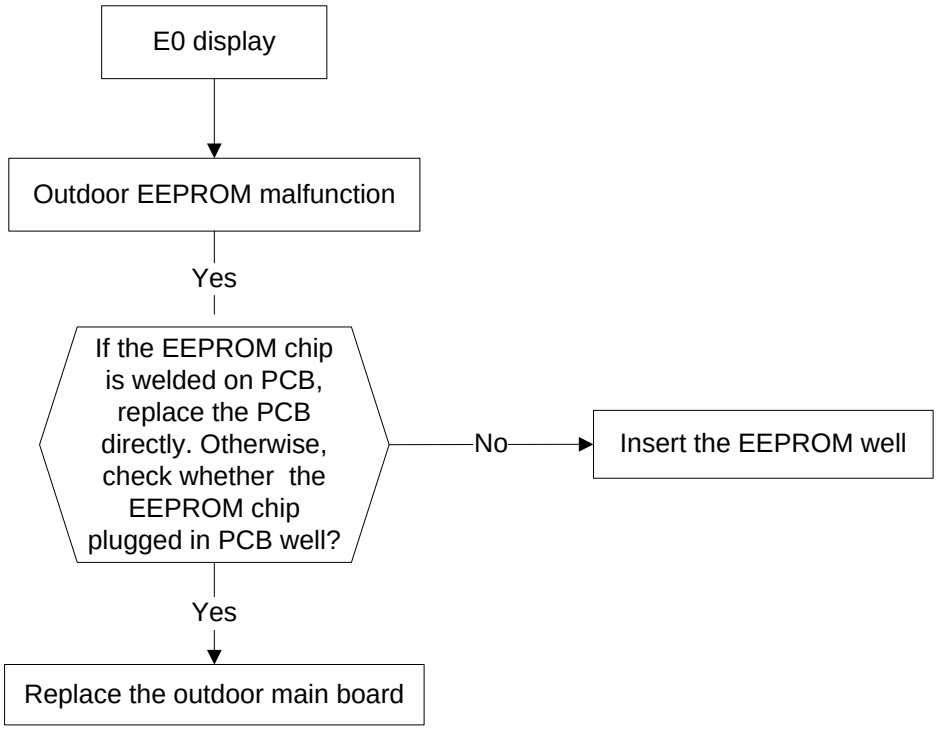
2.4.3 For the unit with TWINS function

2.4.3.1 Communication failure between master unit and indoor unit

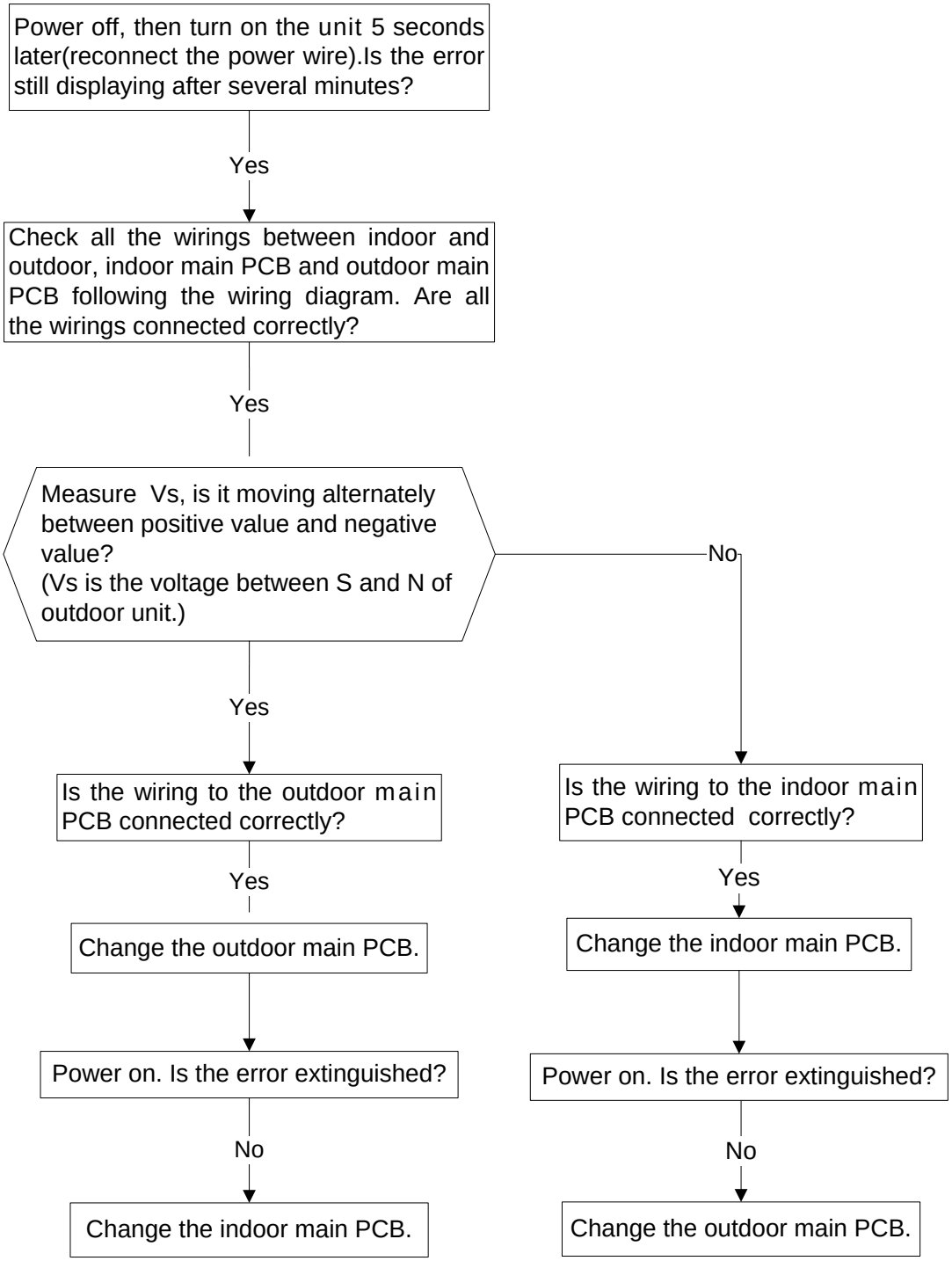

F3 Displayed
Communication failure between master unit and slave unit
Check the dial switch settings of master unit and slave unit, is it right?
No
Correct the settings
Yes
Check the PQE communication wires connection, is it good enough?
No
Correct the wire connections
Yes
One of the 2 indoor PCBs is defective. Connect only one indoor unit to the outdoor unit separately. The one caused E1 error code is defective
Problem is solved

2.4.4 For the outdoor unit

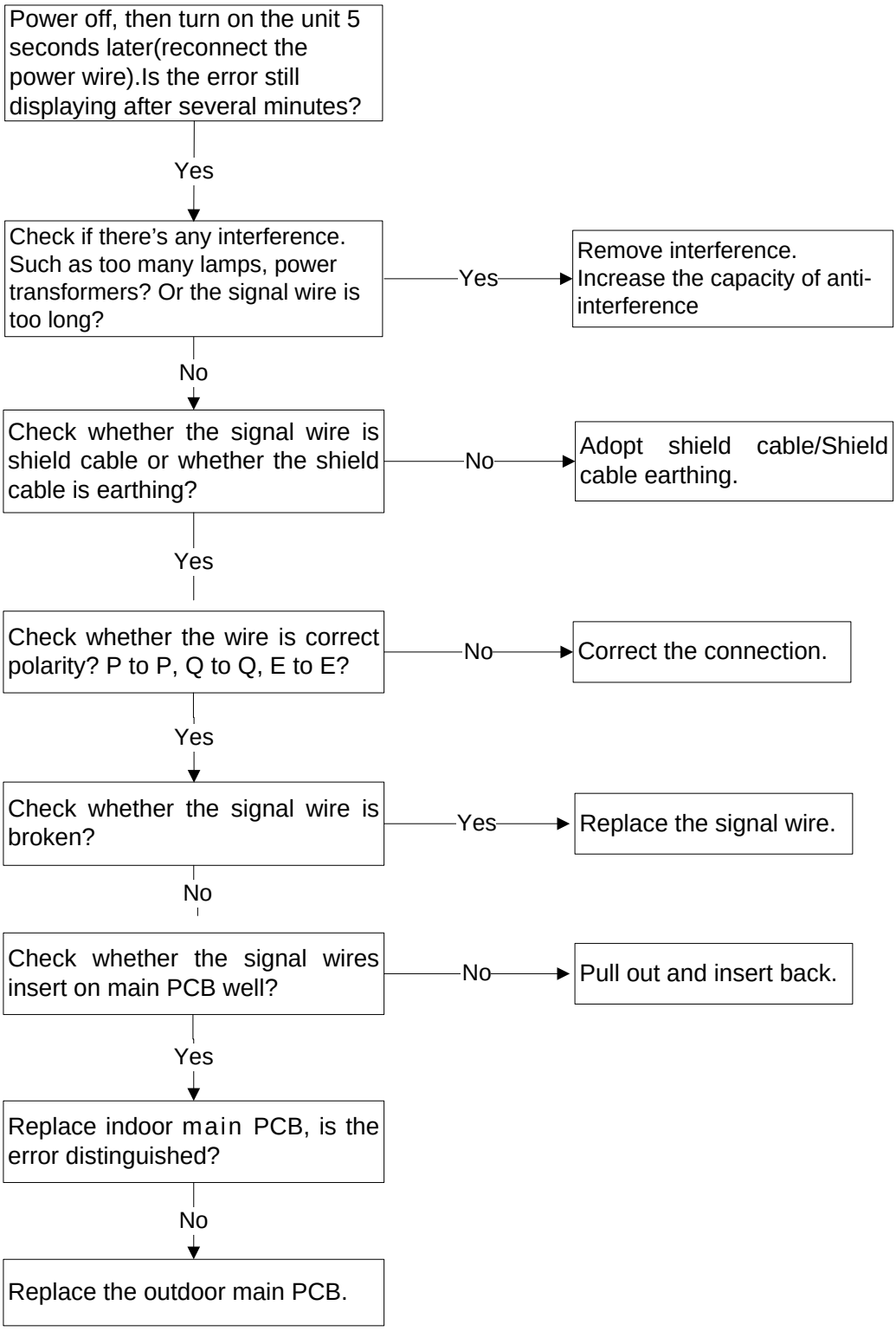
2.4.4.2. E0 malfunction


E0 display
Outdoor EEPROM malfunction
Yes
If the EEPROM chip is welded on PCB, replace the PCB directly. Otherwise, check whether the EEPROM chip plugged in PCB well?
No
Insert the EEPROM well
Yes
Replace the outdoor main board

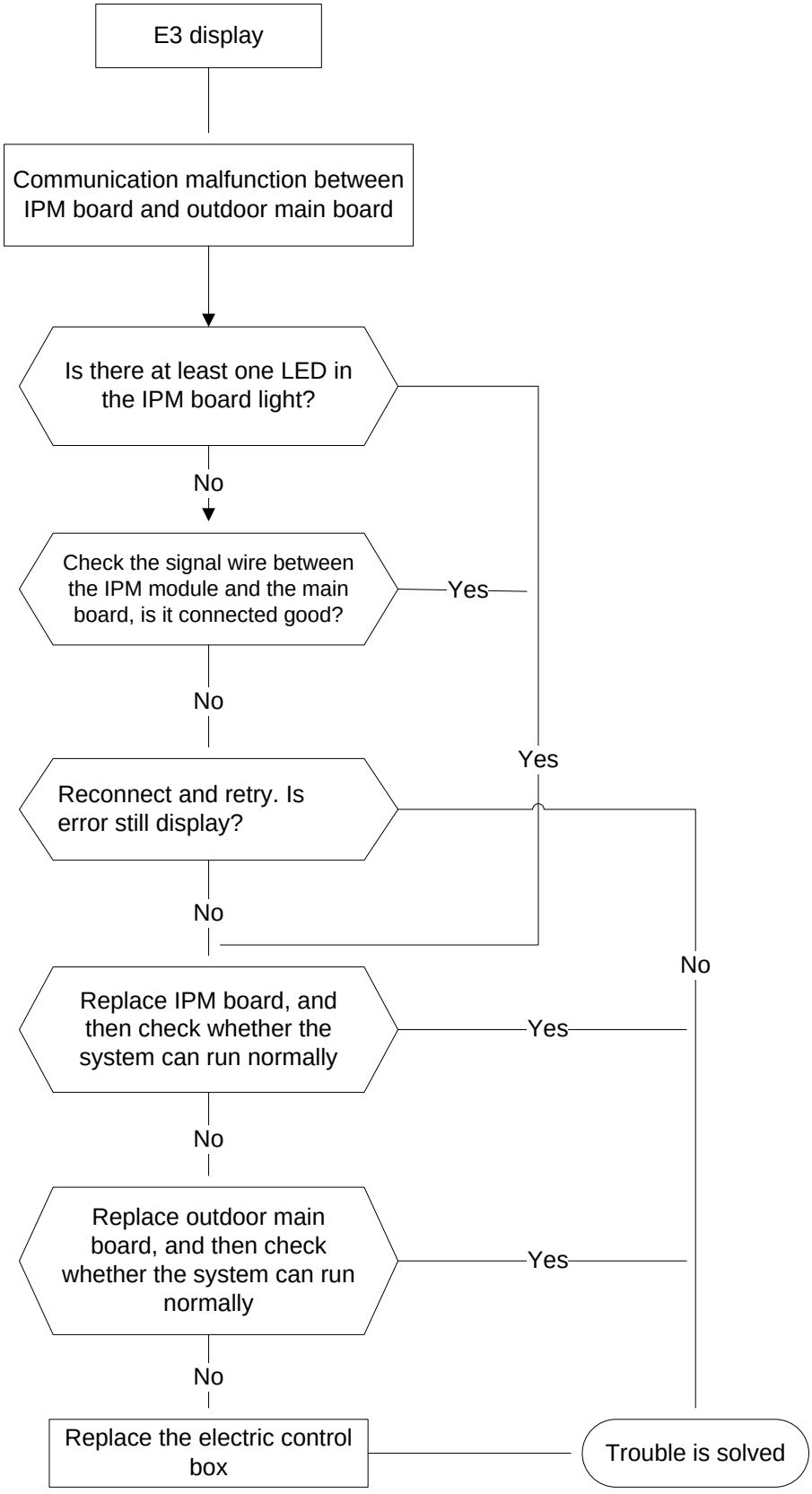
2.4.4.3. E2 malfunction (Only for 12k)


Power off, then turn on the unit 5 seconds later(reconnect the power wire).Is the error still displaying after several minutes?
Yes
Check all the wirings between indoor and outdoor, indoor main PCB and outdoor main PCB following the wiring diagram. Are all the wirings connected correctly?
Yes
Measure Vs, is it moving alternately between positive value and negative value?
(Vs is the voltage between S and N of outdoor unit.)
No
Yes
Is the wiring to the outdoor main PCB connected correctly?
Yes
Change the outdoor main PCB.
Power on. Is the error extinguished?
No
Change the indoor main PCB.
Is the wiring to the indoor main PCB connected correctly?
Yes
Change the indoor main PCB.
Power on. Is the error extinguished?
No
Change the outdoor main PCB.

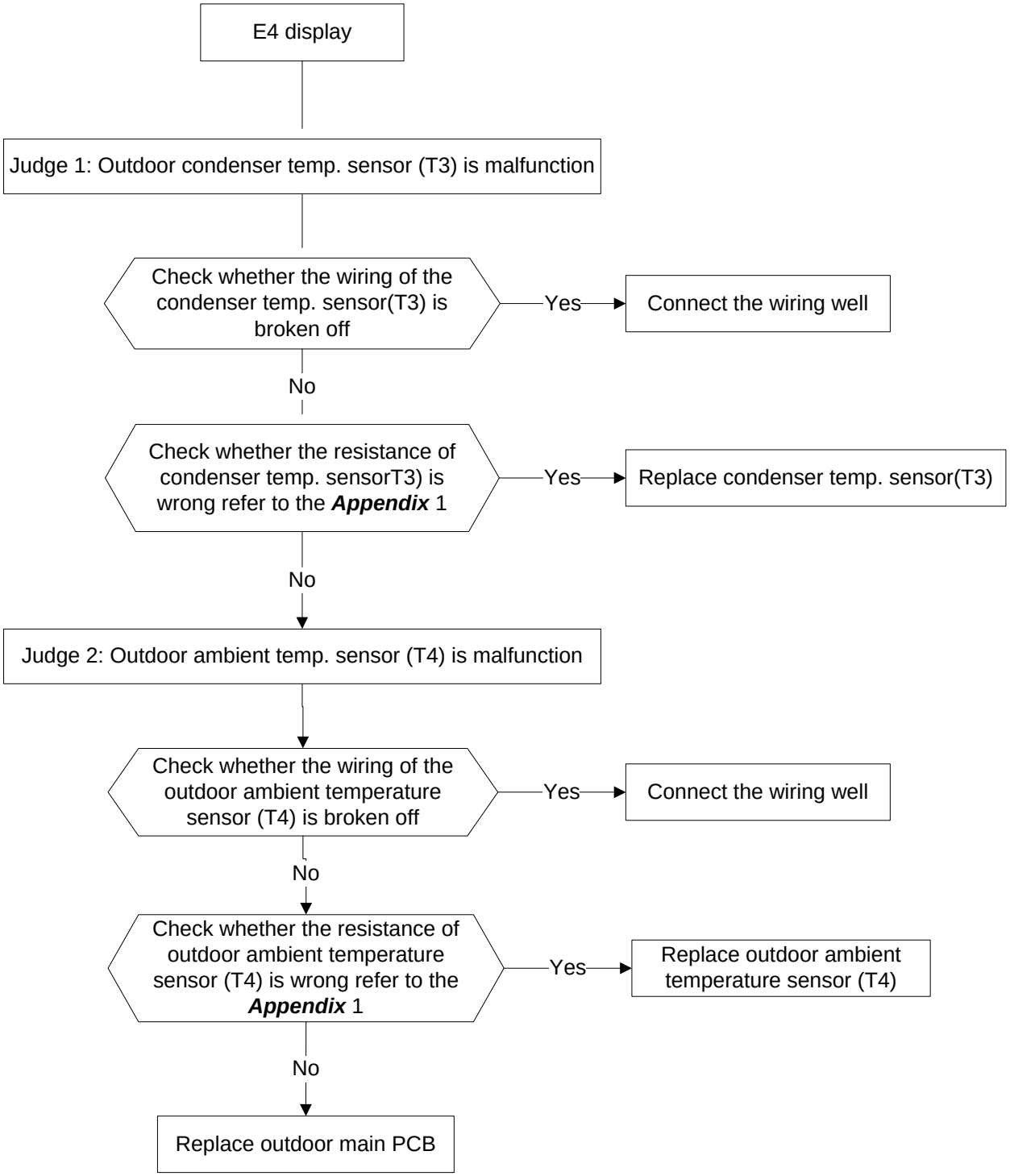
2.4.4.4. E2 malfunction (For 18-60k)


Power off, then turn on the unit 5 seconds later(reconnect the power wire).Is the error still displaying after several minutes?
Yes
Check if there's any interference. Such as too many lamps, power transformers? Or the signal wire is too long?
Yes
Remove interference. Increase the capacity of anti-interference
No
Check whether the signal wire is shield cable or whether the shield cable is earthing?
No
Adopt shield cable/Shield cable earthing.
Yes
Check whether the wire is correct polarity? P to P, Q to Q, E to E?
No
Correct the connection.
Yes
Check whether the signal wire is broken?
Yes
Replace the signal wire.
No
Check whether the signal wires insert on main PCB well?
No
Pull out and insert back.
Yes
Replace indoor main PCB, is the error distinguished?
No
Replace the outdoor main PCB.

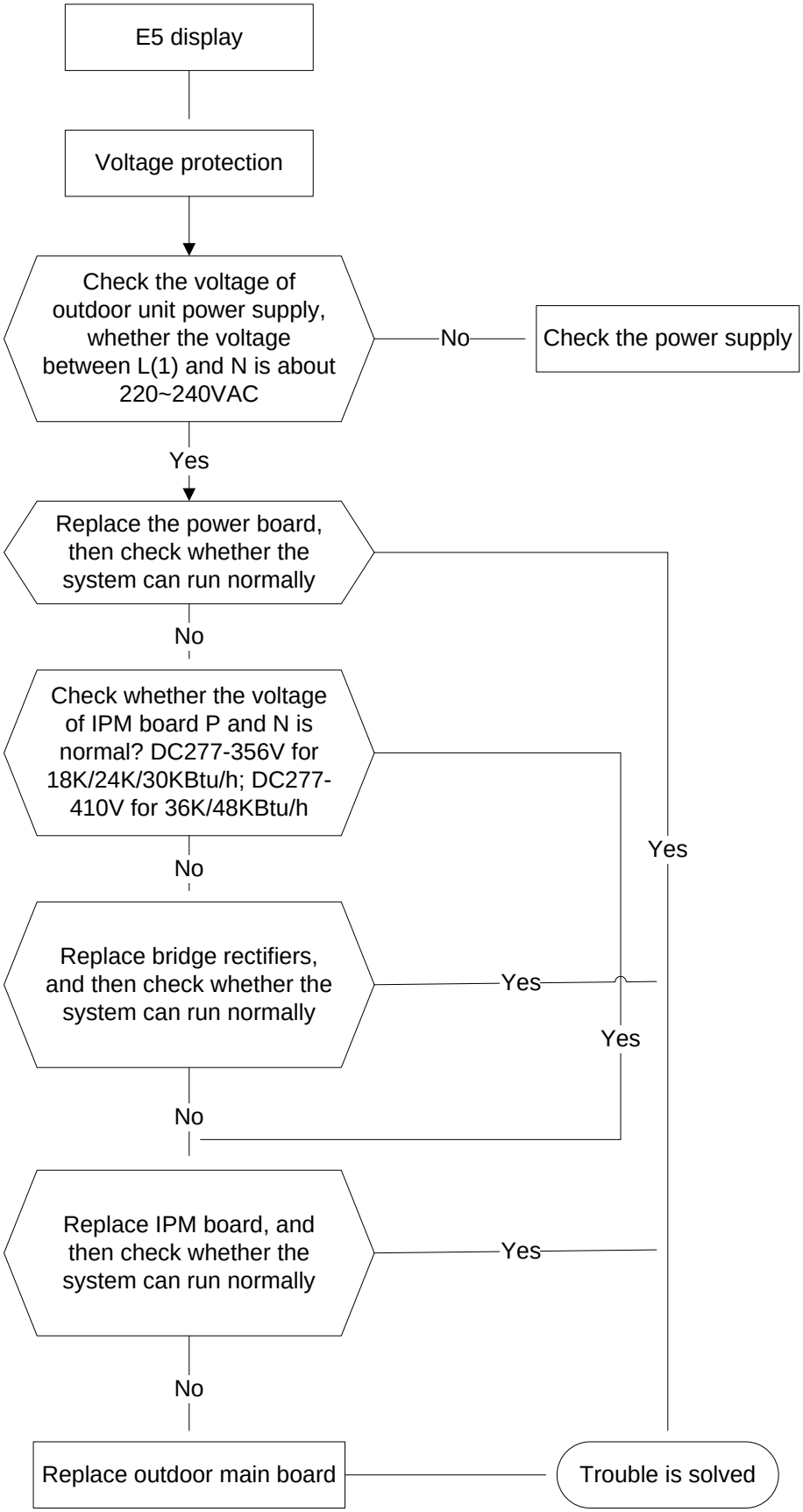
2.4.4.5. E3 malfunction


E3 display
Communication malfunction between IPM board and outdoor main board
Is there at least one LED in the IPM board light?
No
Yes
Check the signal wire between the IPM module and the main board, is it connected good?
Yes
No
Yes
Reconnect and retry. Is error still display?
No
No
Replace IPM board, and then check whether the system can run normally
Yes
No
Replace outdoor main board, and then check whether the system can run normally
Yes
No
Replace the electric control box
Trouble is solved

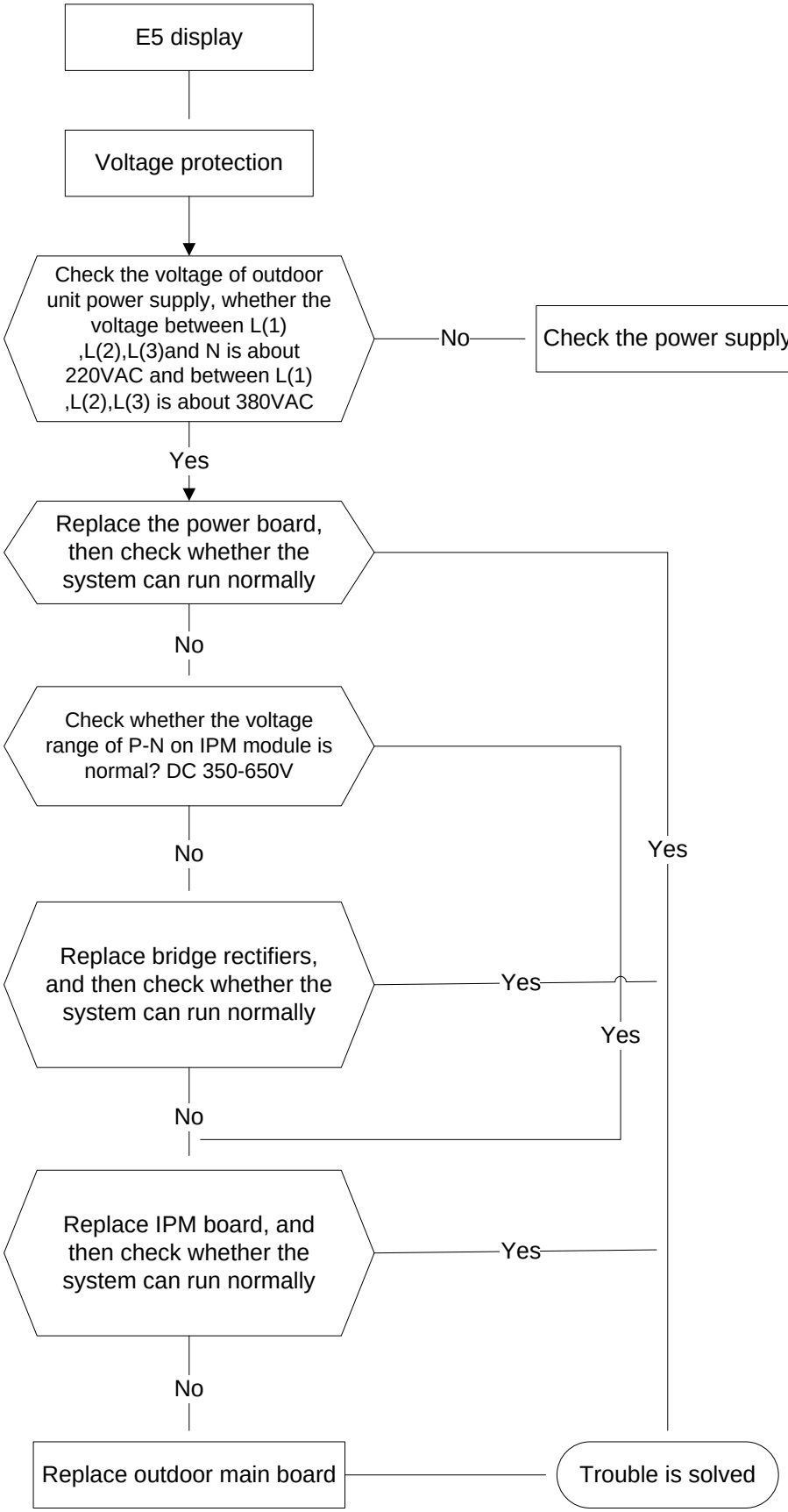
2.4.4.6. E4 malfunction


E4 display
Judge 1: Outdoor condenser temp. sensor (T3) is malfunction
Check whether the wiring of the condenser temp. sensor(T3) is broken off
Yes
Connect the wiring well
No
Check whether the resistance of condenser temp. sensorT3) is wrong refer to the Appendix 1
Yes
Replace condenser temp. sensor(T3)
No
Judge 2: Outdoor ambient temp. sensor (T4) is malfunction
Check whether the wiring of the outdoor ambient temperature sensor (T4) is broken off
Yes
Connect the wiring well
No
Check whether the resistance of outdoor ambient temperature sensor (T4) is wrong refer to the Appendix 1
Yes
Replace outdoor ambient temperature sensor (T4)
No
Replace outdoor main PCB

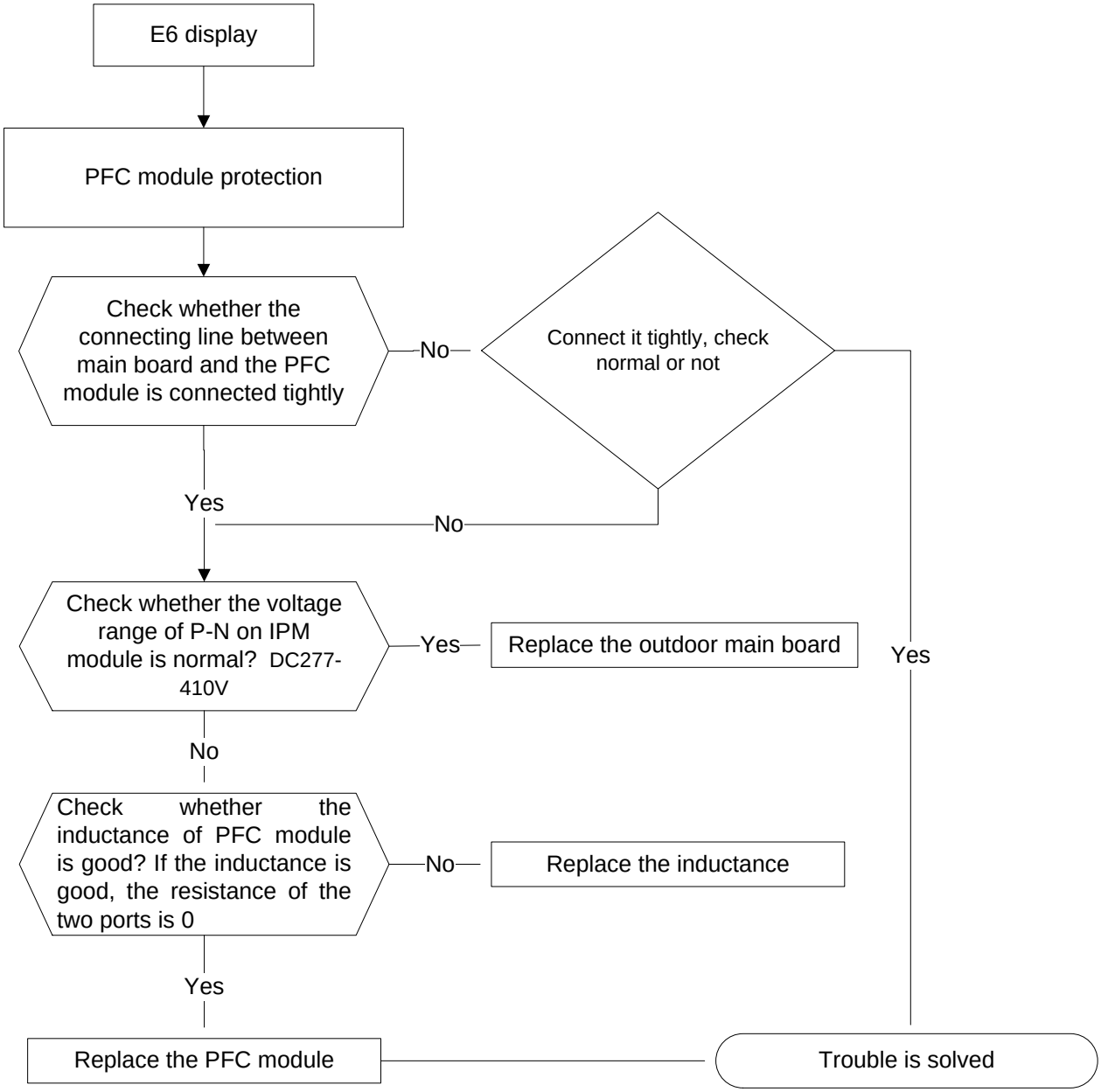
2.4.4.7. E5 malfunction (For single phase units)


E5 display
Voltage protection
Check the voltage of outdoor unit power supply, whether the voltage between L(1) and N is about 220~240VAC
No
Check the power supply
Yes
Replace the power board, then check whether the system can run normally
No
Check whether the voltage of IPM board P and N is normal? DC277-356V for 18K/24K/30KBtu/h; DC277-410V for 36K/48KBtu/h
No
Replace bridge rectifiers, and then check whether the system can run normally
Yes
Yes
No
Replace IPM board, and then check whether the system can run normally
Yes
No
Replace outdoor main board
Trouble is solved
Yes

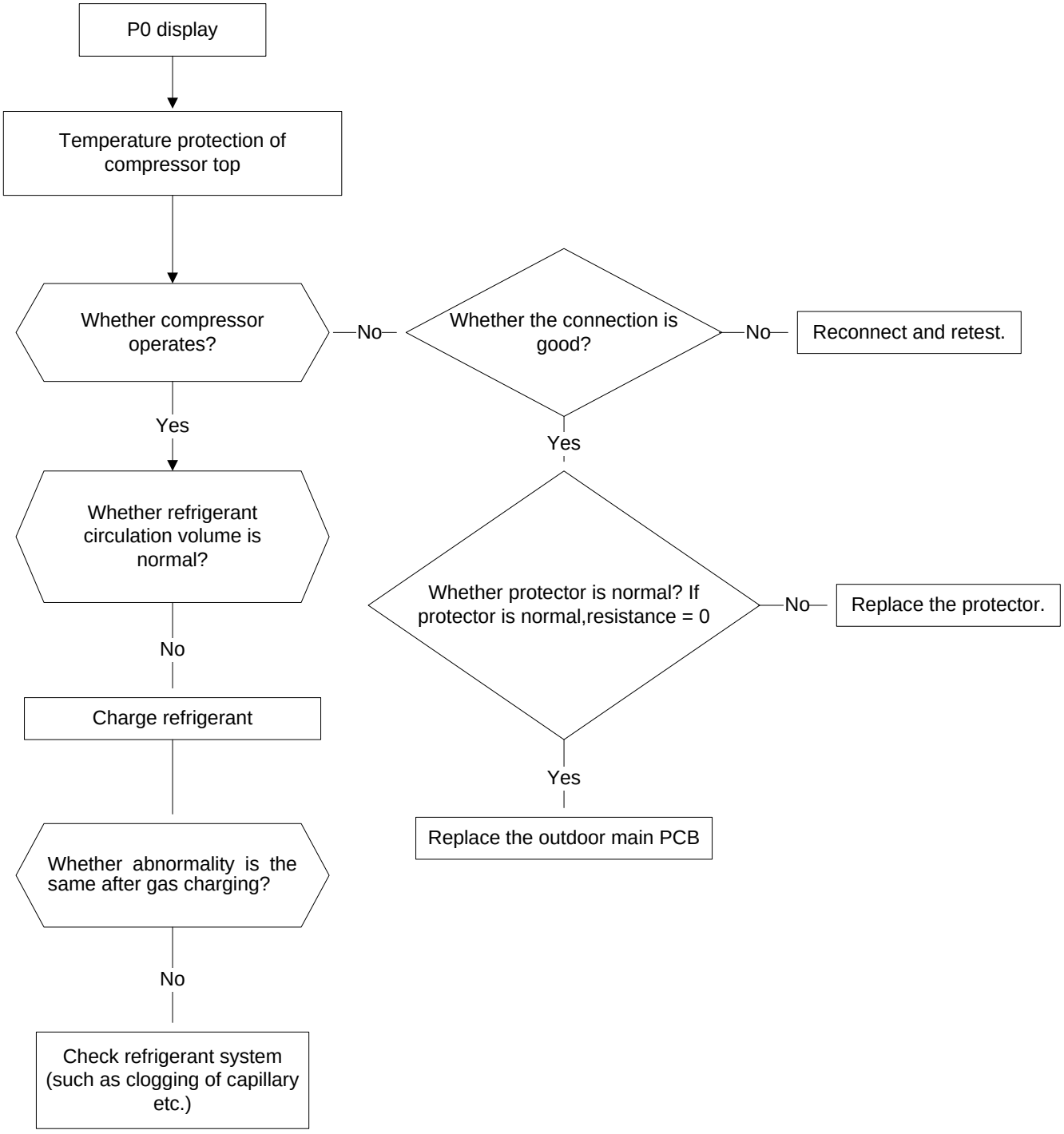
2.4.4.8. E5 malfunction (For three phases units)


E5 display
Voltage protection
Check the voltage of outdoor unit power supply, whether the voltage between L(1) ,L(2),L(3)and N is about 220VAC and between L(1) ,L(2),L(3) is about 380VAC
No
Check the power supply
Yes
Replace the power board, then check whether the system can run normally
No
Check whether the voltage range of P-N on IPM module is normal? DC 350-650V
No
Yes
Replace bridge rectifiers, and then check whether the system can run normally
Yes
Yes
No
Replace IPM board, and then check whether the system can run normally
Yes
No
Replace outdoor main board
Trouble is solved

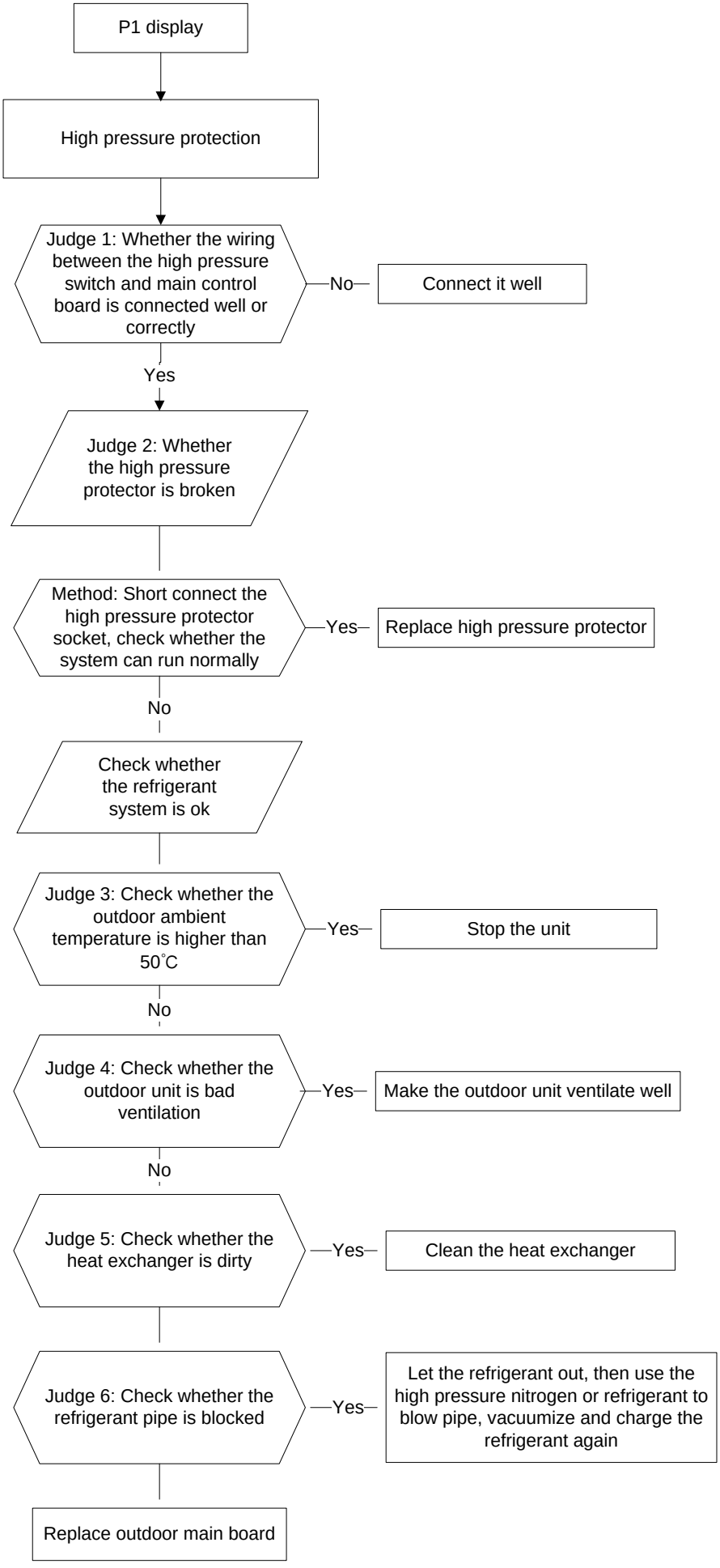
2.4.4.9. E6 malfunction (Only for 36K, 48K with 1 phase)


E6 display
PFC module protection
Check whether the connecting line between main board and the PFC module is connected tightly
No
Connect it tightly, check normal or not
Yes
No
Yes
Check whether the voltage range of P-N on IPM module is normal? DC277-410V
Yes
Replace the outdoor main board
No
Check whether the inductance of PFC module is good? If the inductance is good, the resistance of the two ports is 0
No
Replace the inductance
Yes
Replace the PFC module
Trouble is solved

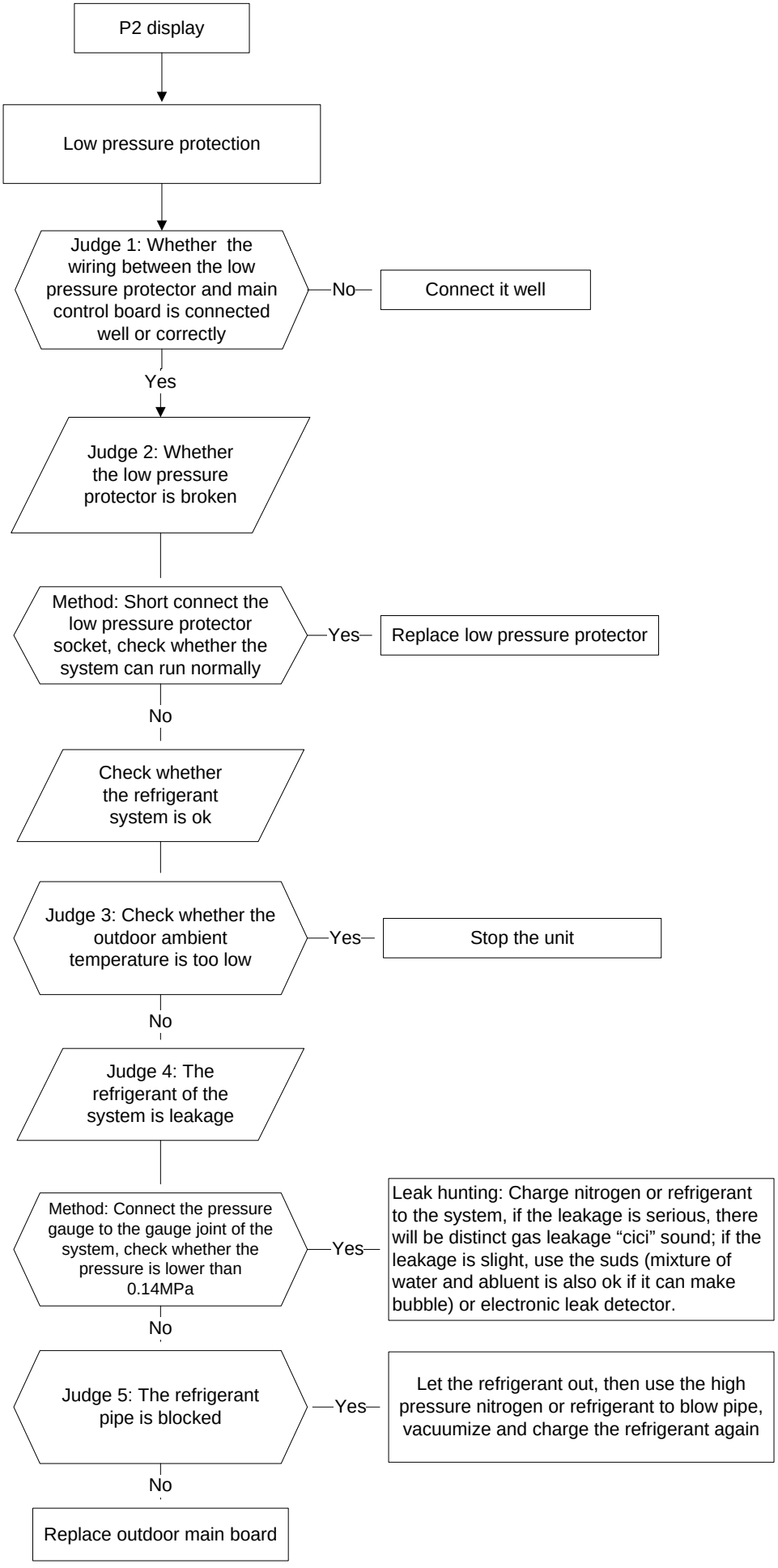
2.4.4.10. P0 malfunction



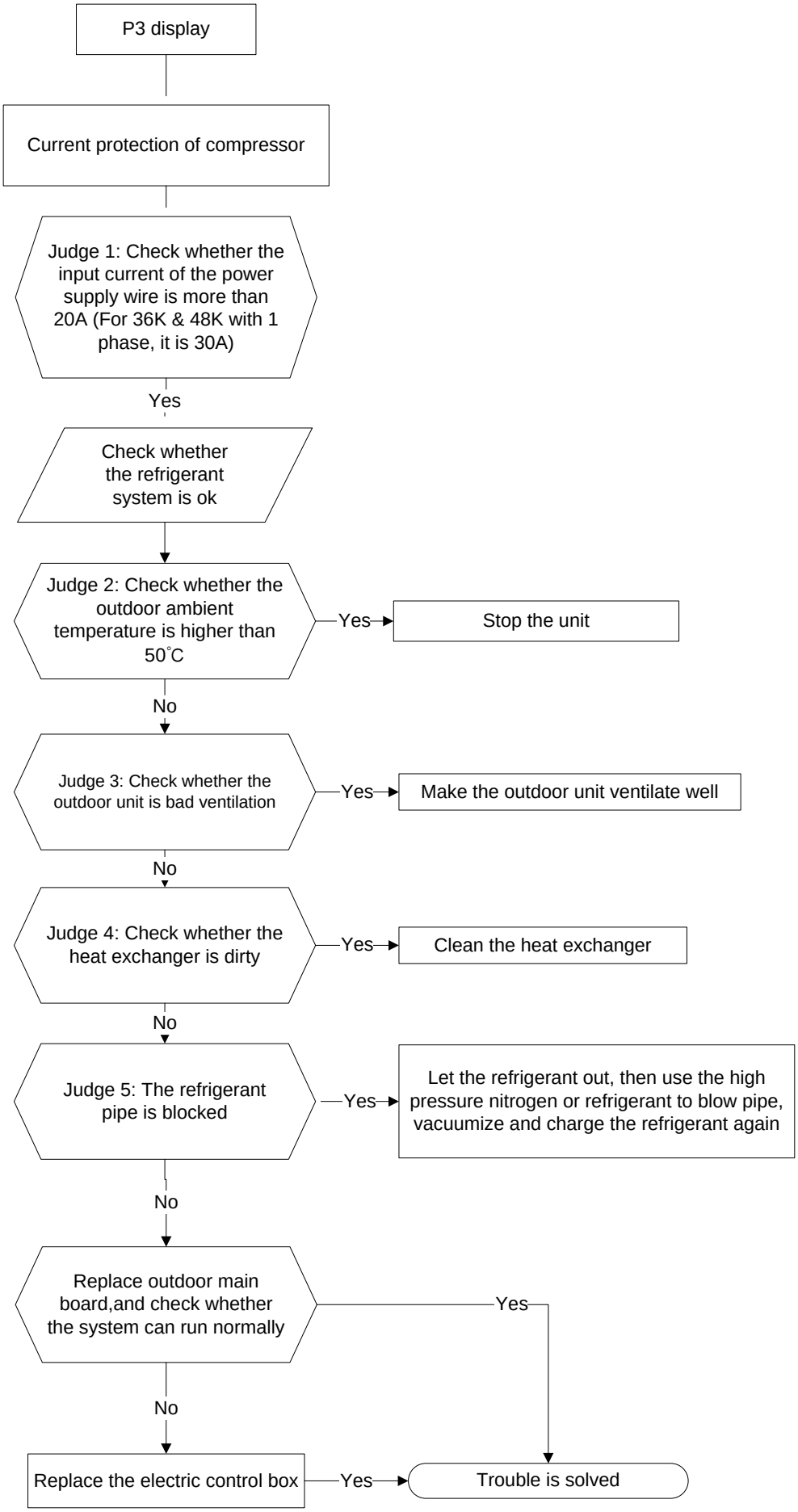
2.4.4.11. P1 malfunction (Only for 30K~60K)


P1 display
High pressure protection
Judge 1: Whether the wiring between the high pressure switch and main control board is connected well or correctly
No
Connect it well
Yes
Judge 2: Whether the high pressure protector is broken
Method: Short connect the high pressure protector socket, check whether the system can run normally
Yes
Replace high pressure protector
No
Check whether the refrigerant system is ok
Judge 3: Check whether the outdoor ambient temperature is higher than 50℃
Yes
Stop the unit
No
Judge 4: Check whether the outdoor unit is bad ventilation
Yes
Make the outdoor unit ventilate well
No
Judge 5: Check whether the heat exchanger is dirty
Yes
Clean the heat exchanger
Judge 6: Check whether the refrigerant pipe is blocked
Yes
Let the refrigerant out, then use the high pressure nitrogen or refrigerant to blow pipe, vacuumize and charge the refrigerant again
Replace outdoor main board

2.4.4.12. P2 malfunction (Only for 30K~60K)

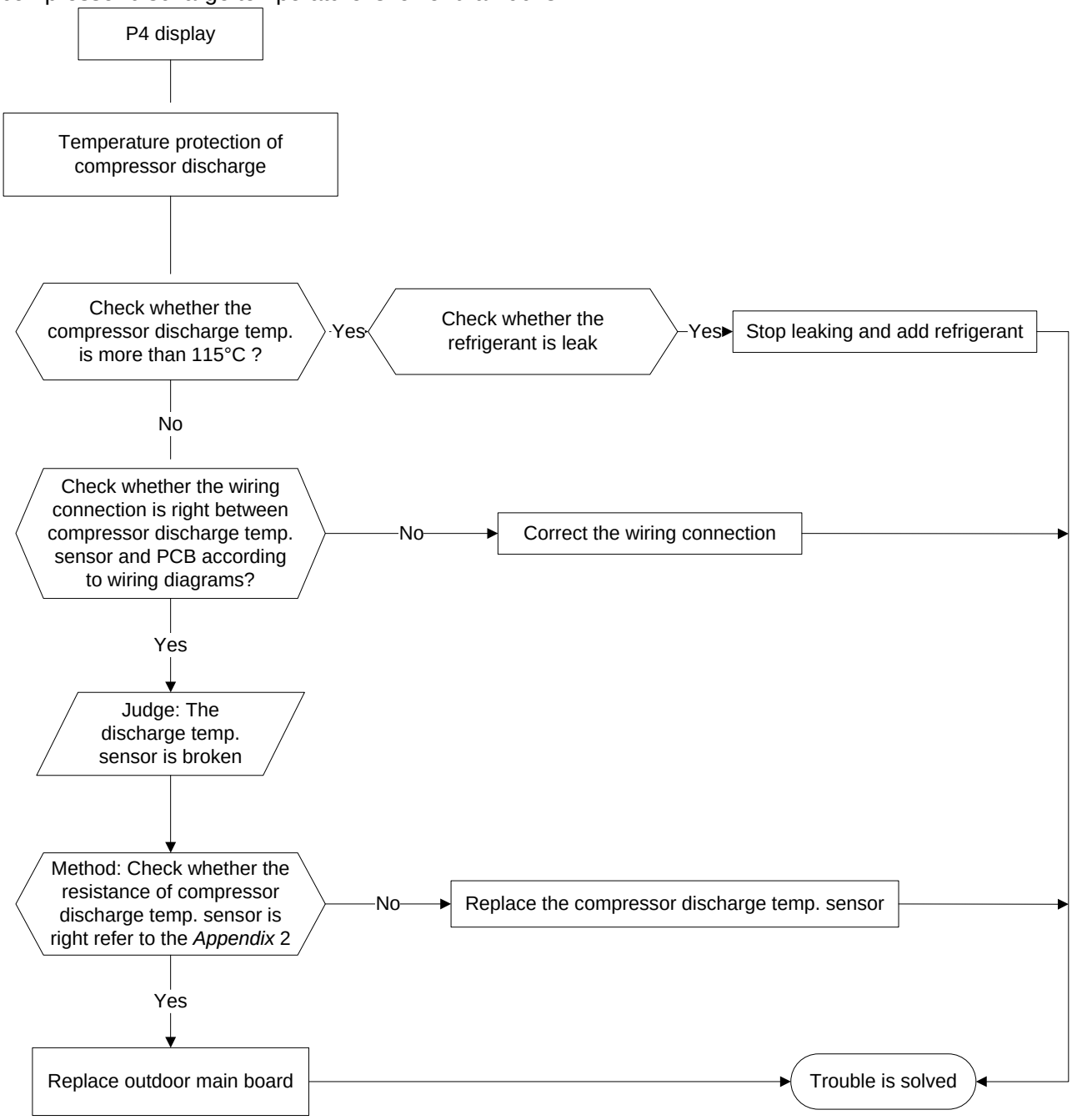

P2 display
Low pressure protection
Judge 1: Whether the wiring between the low pressure protector and main control board is connected well or correctly
No
Connect it well
Yes
Judge 2: Whether the low pressure protector is broken
Method: Short connect the low pressure protector socket, check whether the system can run normally
Yes
Replace low pressure protector
No
Check whether the refrigerant system is ok
Judge 3: Check whether the outdoor ambient temperature is too low
Yes
Stop the unit
No
Judge 4: The refrigerant of the system is leakage
Method: Connect the pressure gauge to the gauge joint of the system, check whether the pressure is lower than 0.14MPa
Yes
Leak hunting: Charge nitrogen or refrigerant to the system, if the leakage is serious, there will be distinct gas leakage “cici” sound; if the leakage is slight, use the suds (mixture of water and abluent is also ok if it can make bubble) or electronic leak detector.
No
Judge 5: The refrigerant pipe is blocked
Yes
Let the refrigerant out, then use the high pressure nitrogen or refrigerant to blow pipe, vacuumize and charge the refrigerant again
No
Replace outdoor main board

2.4.4.13. P3 malfunction


P3 display
Current protection of compressor
Judge 1: Check whether the input current of the power supply wire is more than 20A (For 36K & 48K with 1 phase, it is 30A)
Yes
Check whether the refrigerant system is ok
Judge 2: Check whether the outdoor ambient temperature is higher than 50℃
Yes
Stop the unit
No
Judge 3: Check whether the outdoor unit is bad ventilation
Yes
Make the outdoor unit ventilate well
No
Judge 4: Check whether the heat exchanger is dirty
Yes
Clean the heat exchanger
No
Judge 5: The refrigerant pipe is blocked
Yes
Let the refrigerant out, then use the high pressure nitrogen or refrigerant to blow pipe, vacuumize and charge the refrigerant again
No
Replace outdoor main board,and check whether the system can run normally
Yes
No
Replace the electric control box
Yes
Trouble is solved

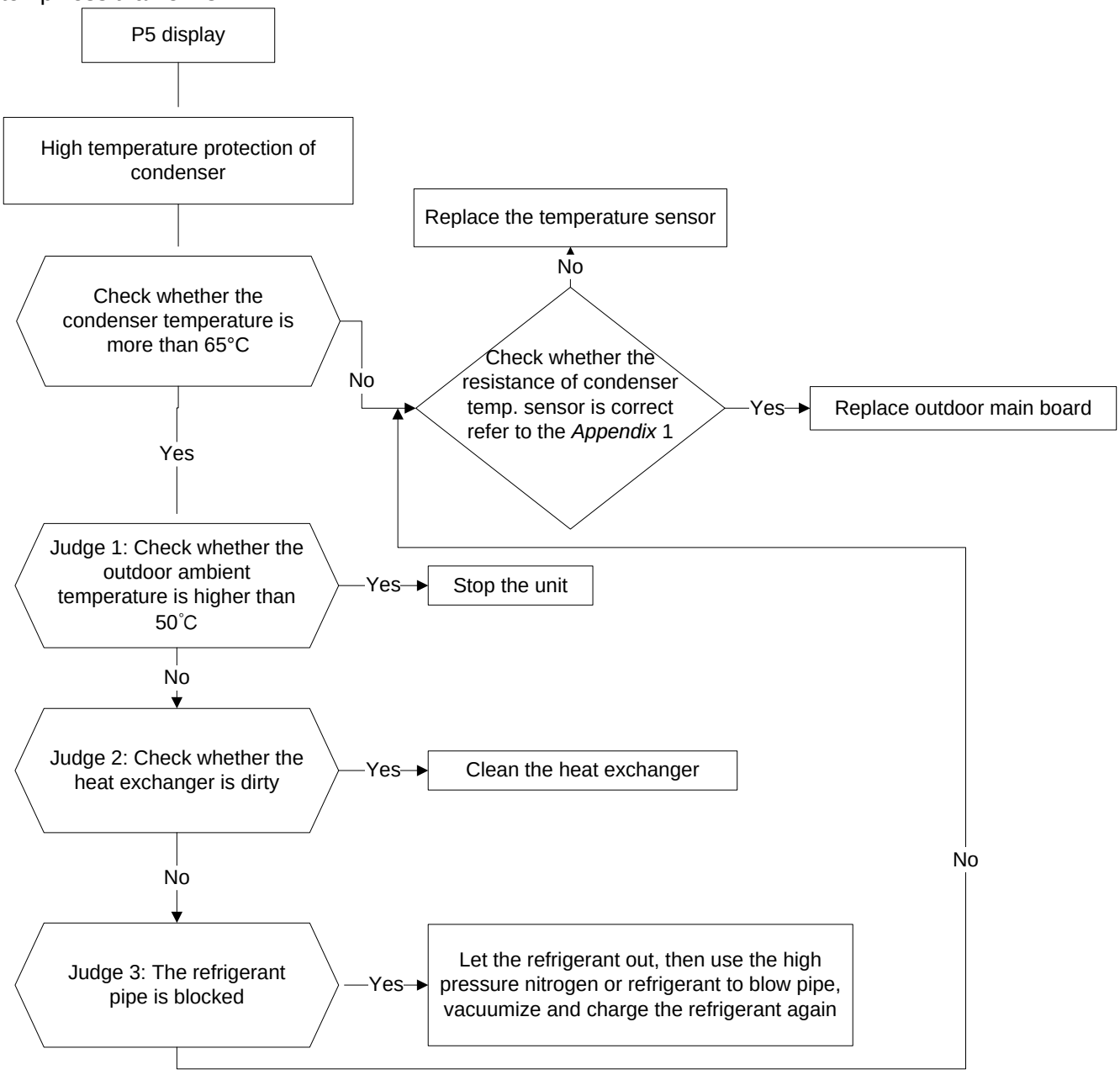
2.4.4.14. P4 malfunction

When compressor discharge temperature is higher than 115°C, the unit will stop, and unit runs again when compressor discharge temperature is lower than 90°C.


P4 display
Temperature protection of compressor discharge
Check whether the compressor discharge temp. is more than 115°C ?
Yes
Check whether the refrigerant is leak
Yes
Stop leaking and add refrigerant
No
Check whether the wiring connection is right between compressor discharge temp. sensor and PCB according to wiring diagrams?
No
Correct the wiring connection
Yes
Judge: The discharge temp. sensor is broken
Method: Check whether the resistance of compressor discharge temp. sensor is right refer to the *Appendix* 2
No
Replace the compressor discharge temp. sensor
Yes
Replace outdoor main board
Trouble is solved

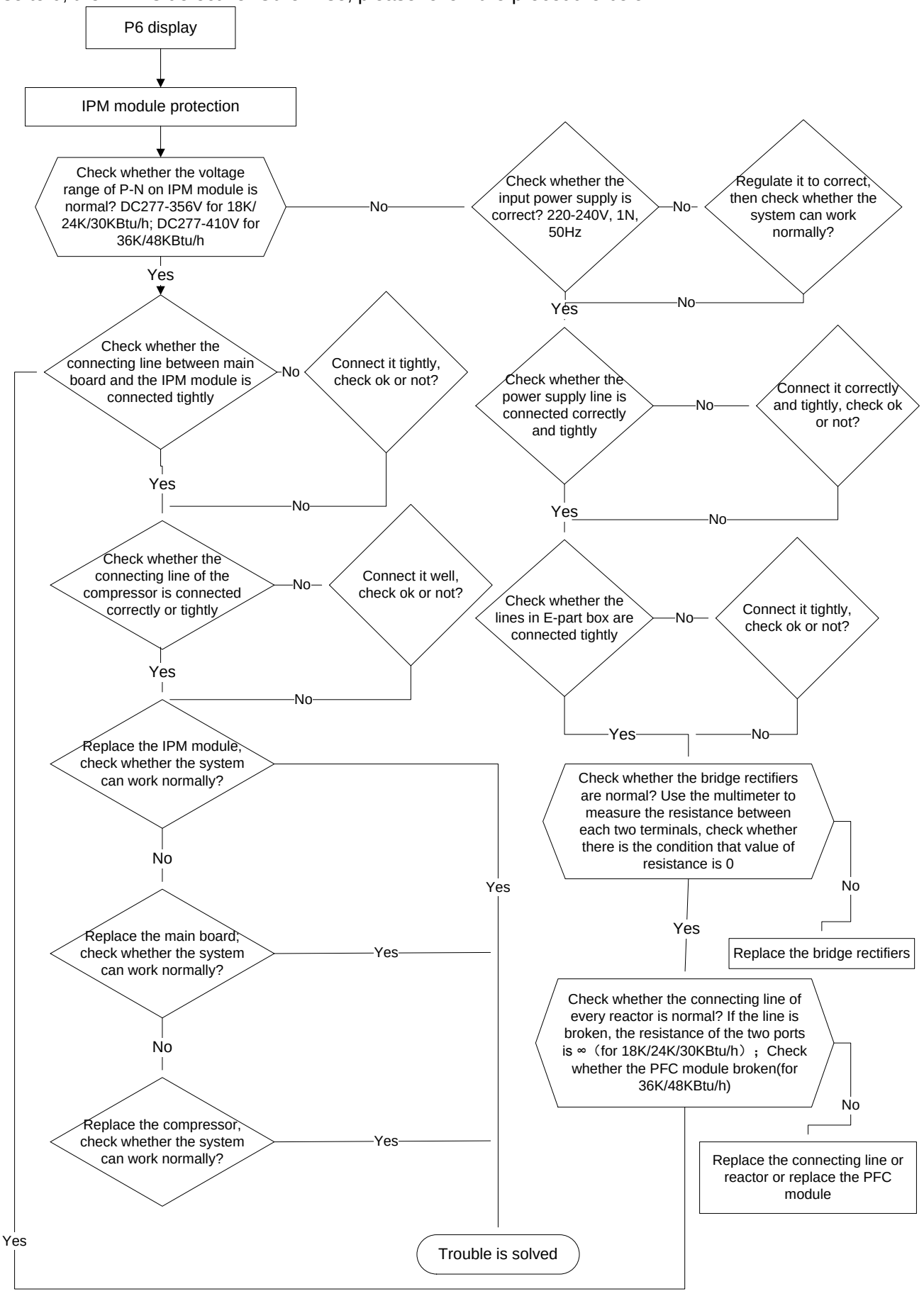
2.4.4.15. P5 malfunction

When condenser high temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.


P5 display
High temperature protection of condenser
Check whether the condenser temperature is more than 65°C
No
Check whether the resistance of condenser temp. sensor is correct refer to the *Appendix* 1
Yes
Replace outdoor main board
No
Replace the temperature sensor
Yes
Judge 1: Check whether the outdoor ambient temperature is higher than 50°C
Yes
Stop the unit
No
Judge 2: Check whether the heat exchanger is dirty
Yes
Clean the heat exchanger
No
Judge 3: The refrigerant pipe is blocked
Yes
Let the refrigerant out, then use the high pressure nitrogen or refrigerant to blow pipe, vacuumize and charge the refrigerant again
No

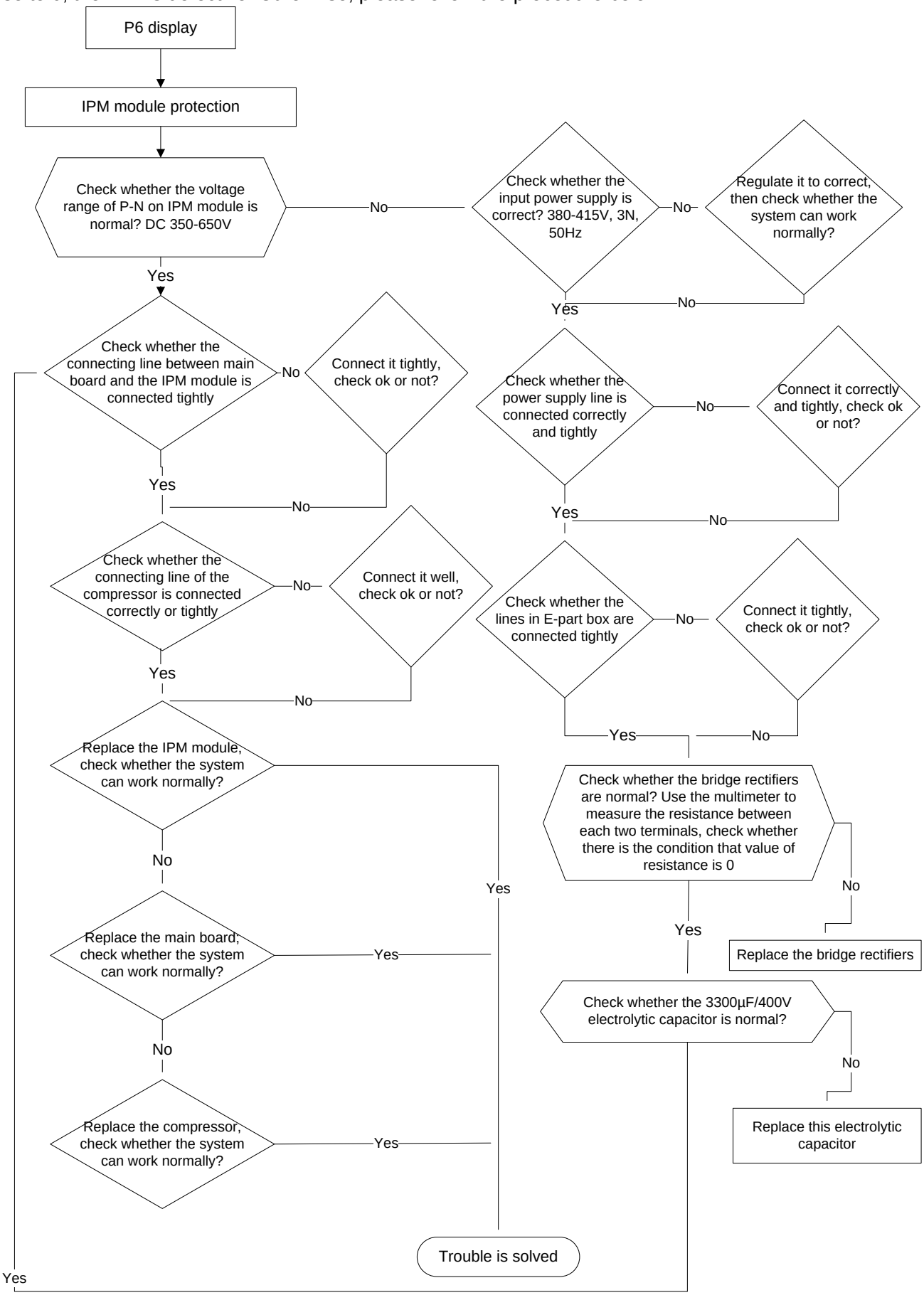
2.4.4.16. P6 malfunction (For single phase units)

At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:

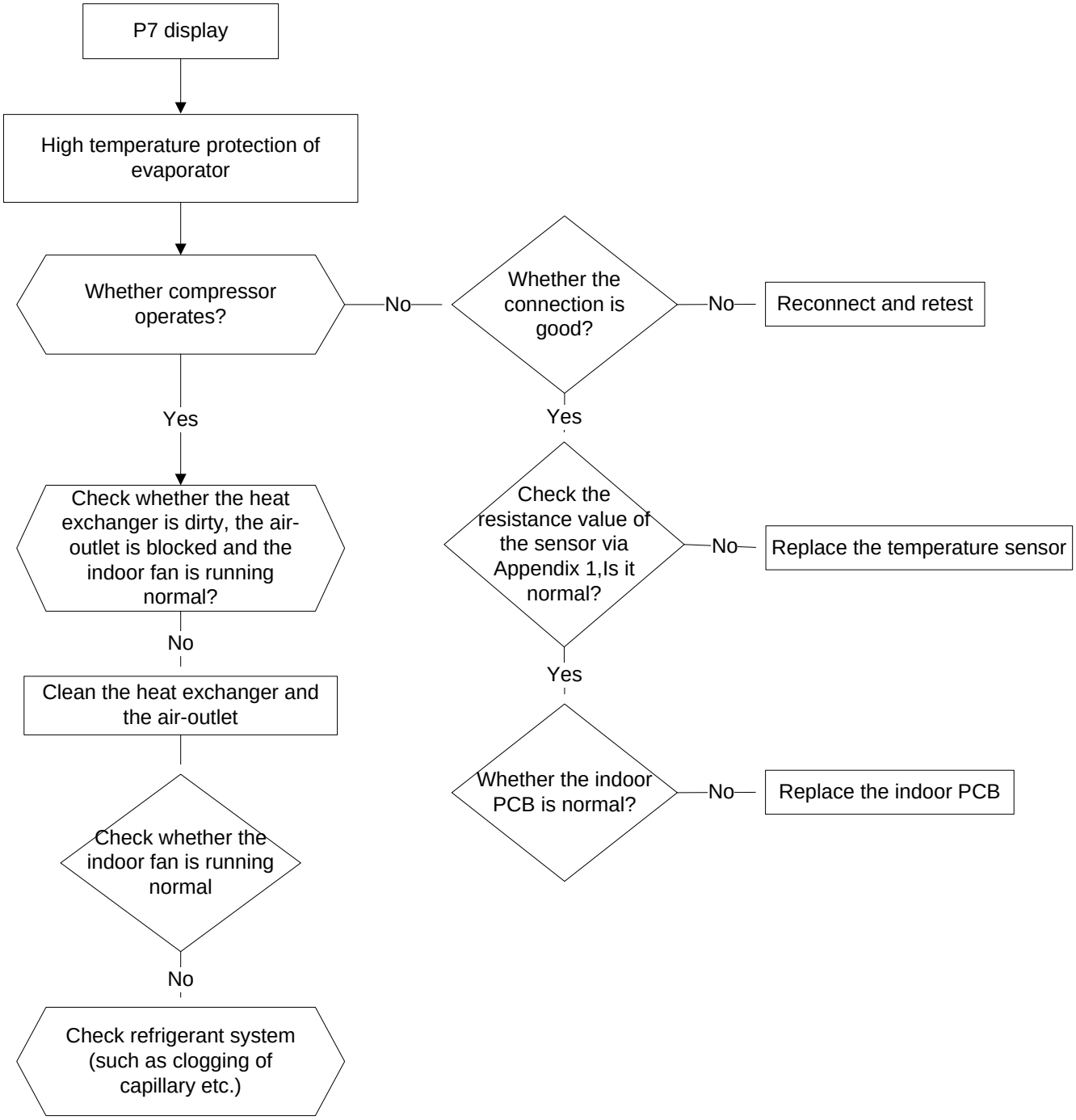

P6 display
IPM module protection
Check whether the voltage range of P-N on IPM module is normal? DC277-356V for 18K/ 24K/30KBtu/h; DC277-410V for 36K/48KBtu/h
No
Check whether the input power supply is correct? 220-240V, 1N, 50Hz
No
Regulate it to correct, then check whether the system can work normally?
Yes
No
Yes
Check whether the connecting line between main board and the IPM module is connected tightly
No
Connect it tightly, check ok or not?
Check whether the power supply line is connected correctly and tightly
No
Connect it correctly and tightly, check ok or not?
Yes
No
Yes
No
Check whether the connecting line of the compressor is connected correctly or tightly
No
Connect it well, check ok or not?
Check whether the lines in E-part box are connected tightly
No
Connect it tightly, check ok or not?
Yes
No
Yes
No
Replace the IPM module, check whether the system can work normally?
Check whether the bridge rectifiers are normal? Use the multimeter to measure the resistance between each two terminals, check whether there is the condition that value of resistance is 0
No
Yes
No
Yes
Replace the main board, check whether the system can work normally?
Yes
Replace the bridge rectifiers
Check whether the connecting line of every reactor is normal? If the line is broken, the resistance of the two ports is ∞（for 18K/24K/30KBtu/h）; Check whether the PFC module broken(for 36K/48KBtu/h)
No
No
Replace the compressor, check whether the system can work normally?
Yes
Replace the connecting line or reactor or replace the PFC module
Yes
Trouble is solved

2.4.4.17. P6 malfunction (For three phases units)

At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:


P6 display
IPM module protection
Check whether the voltage range of P-N on IPM module is normal? DC 350-650V
No
Check whether the input power supply is correct? 380-415V, 3N, 50Hz
No
Regulate it to correct, then check whether the system can work normally?
Yes
No
Yes
Check whether the connecting line between main board and the IPM module is connected tightly
No
Connect it tightly, check ok or not?
Check whether the power supply line is connected correctly and tightly
No
Connect it correctly and tightly, check ok or not?
Yes
No
Yes
No
Check whether the connecting line of the compressor is connected correctly or tightly
No
Connect it well, check ok or not?
Check whether the lines in E-part box are connected tightly
No
Connect it tightly, check ok or not?
Yes
No
Yes
No
Replace the IPM module, check whether the system can work normally?
Yes
Check whether the bridge rectifiers are normal? Use the multimeter to measure the resistance between each two terminals, check whether there is the condition that value of resistance is 0
No
No
Yes
Replace the main board; check whether the system can work normally?
Yes
Yes
Replace the bridge rectifiers
Check whether the 3300μF/400V electrolytic capacitor is normal?
No
No
Replace the compressor, check whether the system can work normally?
Yes
Replace this electrolytic capacitor
Trouble is solved
Yes

2.4.4.18. P7 malfunction


P7 display
High temperature protection of evaporator
Whether compressor operates?
No
Whether the connection is good?
No
Reconnect and retest
Yes
Yes
Check whether the heat exchanger is dirty, the air-outlet is blocked and the indoor fan is running normal?
Check the resistance value of the sensor via Appendix 1,Is it normal?
No
Replace the temperature sensor
No
Yes
Clean the heat exchanger and the air-outlet
Whether the indoor PCB is normal?
No
Replace the indoor PCB
Check whether the indoor fan is running normal
No
Check refrigerant system (such as clogging of capillary etc.)

Appendix 1 Temperature Sensor Resistance Value Table (℃--K)

℃	K Ohm	℃	K Ohm	℃	K Ohm	℃	K Ohm
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

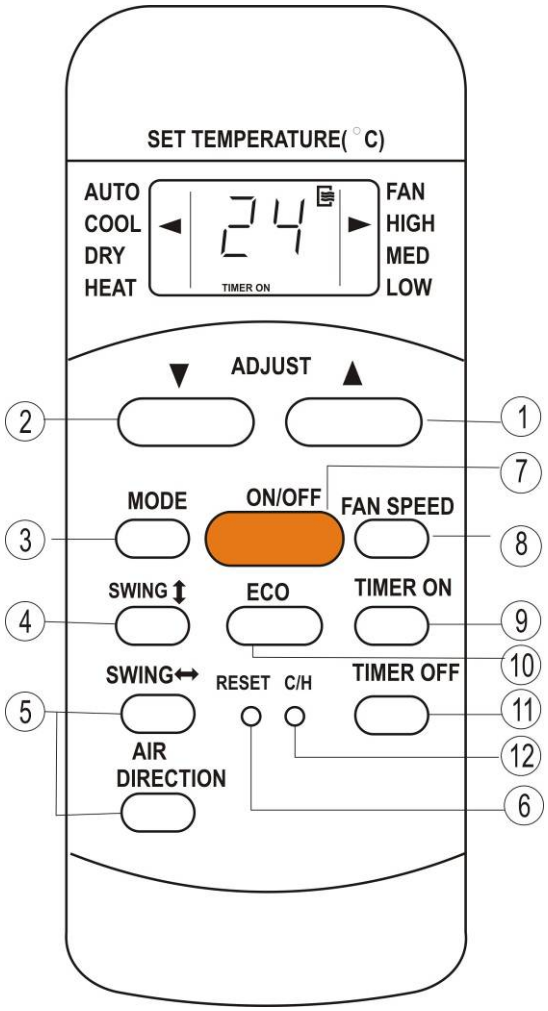
Appendix 2

Unit: ℃---K			Discharge temp. sensor table				
-20	542.7	20	68.66	60	13.59	100	3.702
-19	511.9	21	65.62	61	13.11	101	3.595
-18	483	22	62.73	62	12.65	102	3.492
-17	455.9	23	59.98	63	12.21	103	3.392
-16	430.5	24	57.37	64	11.79	104	3.296
-15	406.7	25	54.89	65	11.38	105	3.203
-14	384.3	26	52.53	66	10.99	106	3.113
-13	363.3	27	50.28	67	10.61	107	3.025
-12	343.6	28	48.14	68	10.25	108	2.941
-11	325.1	29	46.11	69	9.902	109	2.86
-10	307.7	30	44.17	70	9.569	110	2.781
-9	291.3	31	42.33	71	9.248	111	2.704
-8	275.9	32	40.57	72	8.94	112	2.63
-7	261.4	33	38.89	73	8.643	113	2.559
-6	247.8	34	37.3	74	8.358	114	2.489
-5	234.9	35	35.78	75	8.084	115	2.422
-4	222.8	36	34.32	76	7.82	116	2.357
-3	211.4	37	32.94	77	7.566	117	2.294
-2	200.7	38	31.62	78	7.321	118	2.233
-1	190.5	39	30.36	79	7.086	119	2.174
0	180.9	40	29.15	80	6.859	120	2.117
1	171.9	41	28	81	6.641	121	2.061
2	163.3	42	26.9	82	6.43	122	2.007
3	155.2	43	25.86	83	6.228	123	1.955
4	147.6	44	24.85	84	6.033	124	1.905
5	140.4	45	23.89	85	5.844	125	1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1.762
8	121	48	21.26	88	5.32	128	1.717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90	5	130	1.632
11	104.6	51	18.96	91	4.849		
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/50)=3950K	
16	82.54	56	15.73	96	4.167		
17	78.79	57	15.16	97	4.045	R(90℃)=5KΩ±3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		

3. Controller

3.1Wireless Remote Controller

3.1.1RG51Q1/BGE



General Function for wireless remote controller:

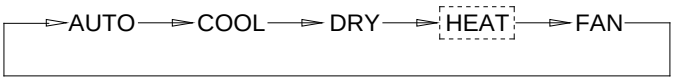
Model	RG51Q1/BGE
Rated voltage	3.0V(2pieces of LR03 7# batteries)
Min voltage for sending signal of CPU	2.4V
Effective receiving distance	8m~11m
Operation condition	-5~60℃

Buttons and functions

1. Adjust ▼ : Decrease the set temp. Keeping pressing will decrease the temp with 1℃ per 0.5s.

2. Adjust ▲ : Increase the set temp. Keeping pressing will increase the temp with 1℃ per 0.5s.

3. MODE: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

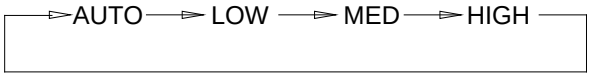
4. VERT SWING: Used to stop or start horizontal louver movement or set the desired up/down air flow direction. The louver changes 6 degree in angle for each press. If keep pushing more than 2 seconds, the louver will swing up and down automatically.

5. HORIZ SWING: Used to stop or start vertical louver movement.

6. AIR DIRECTION: Used to set the desired up/down air flow direction. The louver changes 6 degree in angle for each press.

7. ON/OFF: For turning on or turning off the air conditioner. ► ► ► ► ►

8. FAN SPEED: Fan speed will be selected in following sequence once pressing this button:



9. TIME ON: For time ON setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour. Adjusting the figure to 0.00 will cancel time ON setting.

10. ECO: Activate or turn off economic operation mode. It is suggested to turn on this function when sleeping. (Only available when remote controller is used with corresponding unit.)

11. TIME OFF: For time OFF setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour. ► ► ► ► ►

Adjust the figure to 0.00 will cancel time ON setting.

12. C/H (inner located): Press this button with a needle of 1mm to shift the mode between Cooling only and Cooling & Heating according to the feature of the machine.

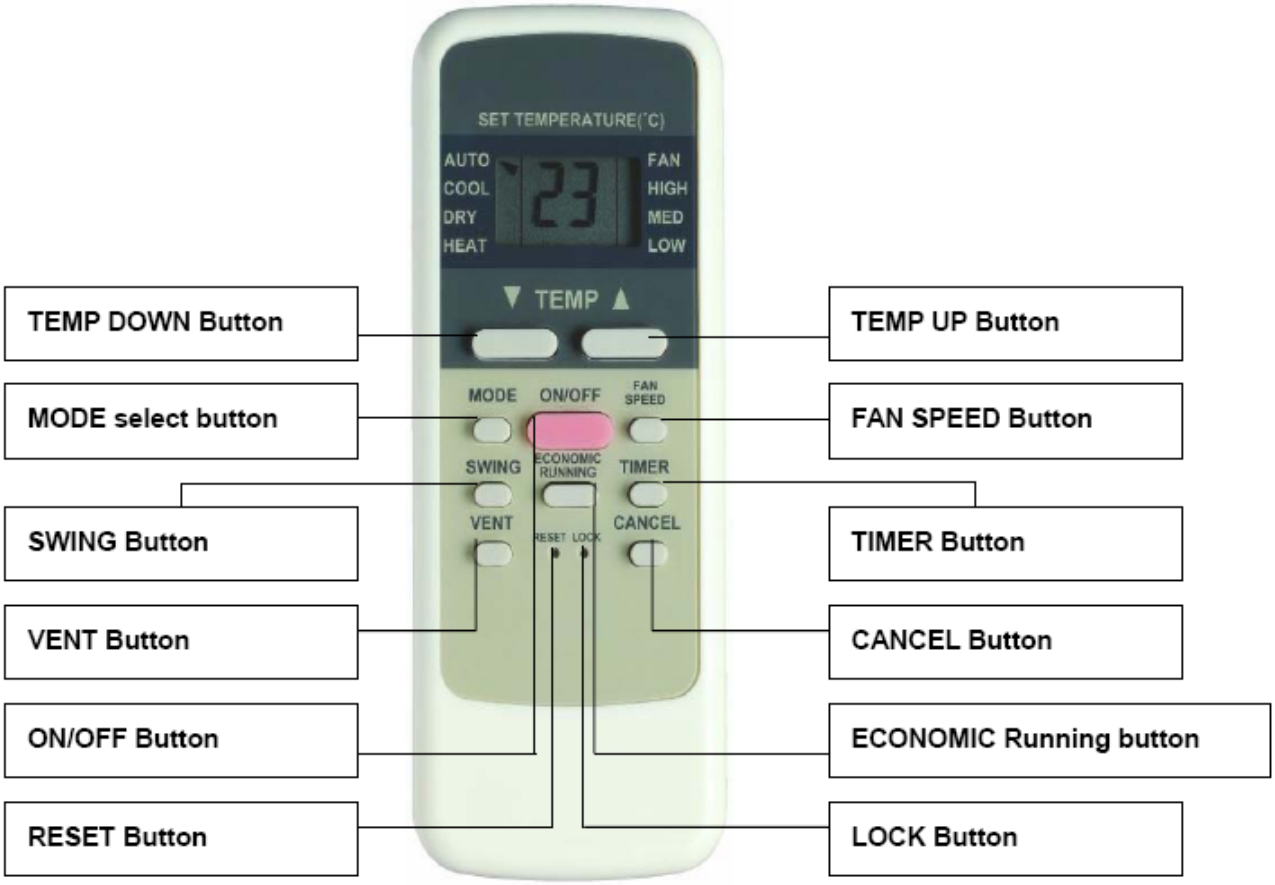
13.RESET (inner located): Press this button with a needle of 1mm to cancel the current setting and reset remote controller.

3.1.2 R51/E

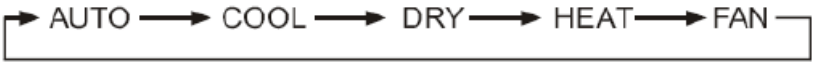
Remote Controller Specifications

Model	R51/E
Rated Voltage	3.0V
Lowest Voltage of CPU Emitting Signal	2.0V
Reaching Distance	8m (when using 3.0 voltage, it can get 11m)
Environment Temperature Range	-5℃～60℃

Introduction of Function Buttons on the Remote Controller



1. TEMP DOWN Button: Push the TEMP DOWN button to decrease the indoor temperature setting or to adjust the timer in a counter-clockwise direction.
2. MODLE SELECT Button: Each time you push the button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, HEAT and FAN as the following figure indicates:



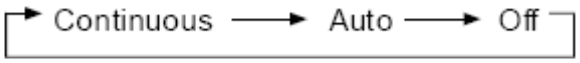
⚠**NOTE:** *HEAT only for Heat Pump*

3. SWING Button: Push this switch button to change the louver angle.
4. RESET Button: When the RESET button is pushed, all of the current settings are cancelled and the control will return to the initial settings.
5. ECONOMIC RUNNING Button: Push this button to go into the Energy-Saving operation mode.
6. LOCK Button: Push this button to lock in all the current settings. To release settings, push again.
7. CANCEL Button: Push this button to cancel the TIMER settings.
8. TIMER Button: This button is used to preset the time ON (start to operate) and the time OFF (turn off the operation)
9. ON/OFF Button: Push this button to start the unit operation. Push the button again to stop the unit operation.

10. FAN SPEED Button: This button is used for setting fan speed in the sequence that goes from AUTO, LOW, MED to HIGH, and then back to Auto.

11. TEMP UP Button: Push this button to increase the indoor temperature setting or to adjust the timer in a counter-clockwise direction.

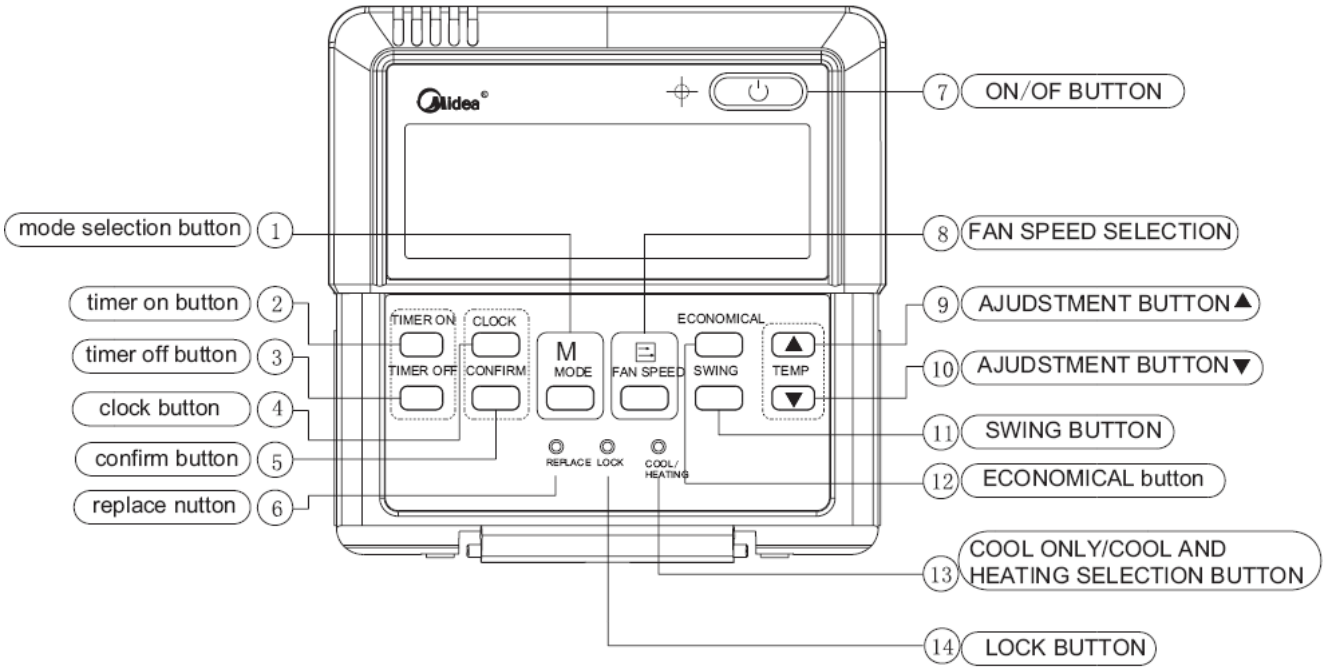
12. VENT Button: Push this button to set the ventilating mode. The ventilating mode will operate in the following sequence:



Ventilation Function is available for the Fresh Star Series.

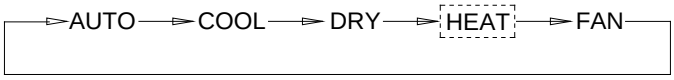
3.2 Wired Remote Controller
3.2.1 KJR-10B

Name and functions of buttons on the wire controller



1 mode selection button:

It is used to select mode, push the button one time, then the operation modes will change In turn as follows:



Remark: no heating mode if wire controller is set as the cool only.

2 Timer on button:

Push the button to set TIMER ON, each time you push the button the time moves forward by o.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0

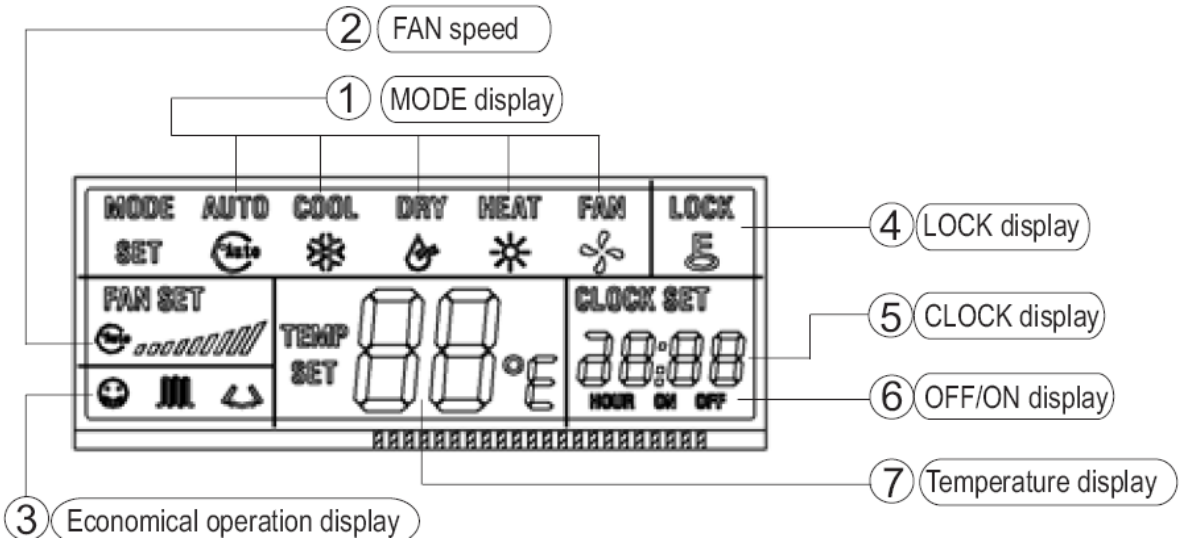
3 Timer off button:

Push the button to set TIMER OFF, each time you push the button the time moves forward by o.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0

4 CLOCK button:

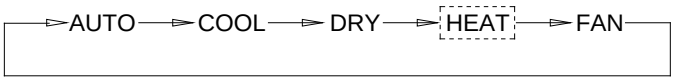
Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When push the button for 4 seconds, the hour part on the clock display flashes every 0.5 seconds, then push button and to adjust hour; push the button CLOCK again, the minute part flashes every 0.5 seconds, then push and button to adjust minute. When set clock or alter clock setting, must push the confirm button to complete the setting

Name and function of LCD on the wire controller



1 Mode select button (MODE):

Press MODE button to select “COOL”, “DRY” , "HEAT", or "FAN ONLY" mode.(HEAT is invalid for COOL ONLY wire controller.)



2 Fan speed button (FAN SPEED)

Press FAN SPEED to select fan speed from "AUTO", "LOW"," MED" , and "HIGH”. NOTE: some air conditioners have no MED fan speed, and then the MED is regarded as HIGH.

3 Economical operation displays:

Press ECONOMICAL to display economical operation, if press ECONOMICAL again then the display disappears

4 Lock display

Press LOCK to display the icon of LOCK. Press the button again then the icon of LOCK disappears. In the mode of LOCK, all the buttons are invalid except for LOCK button.

5 CLOCK display.

Usually display the clock set currently. Press the button CLOCK for 4 seconds, the HOUR part will flash, press button ▲ and ▼ to adjust HOUR. Press the button CLOCK again, the minute part flash, press button▲ or▼ to adjust MINUTE. After clock set or clock operation, it must press CONFIRM to complete the set.

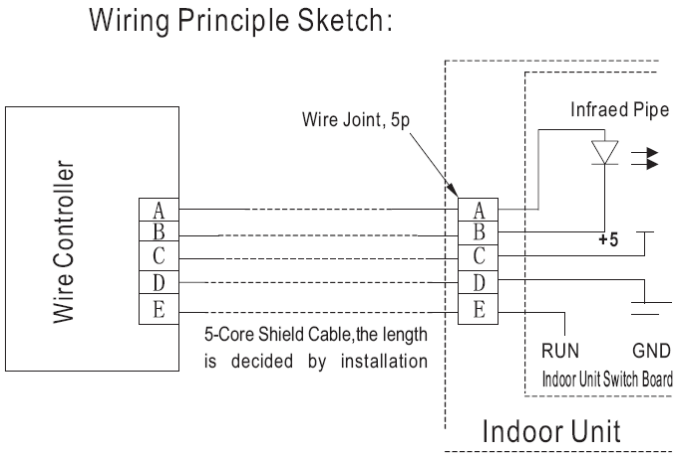
6 TIMER ON/OFF display:

Display ON at the state of TIMER ON adjustment or after only set the TIMER ON; Display OFF at the state of TIMER OFF adjustment or after only set the TIMER OFF; Display ON/OFF if simultaneously set the mode of TIMER ON and TIMER OFF.

7 Temperature display area:

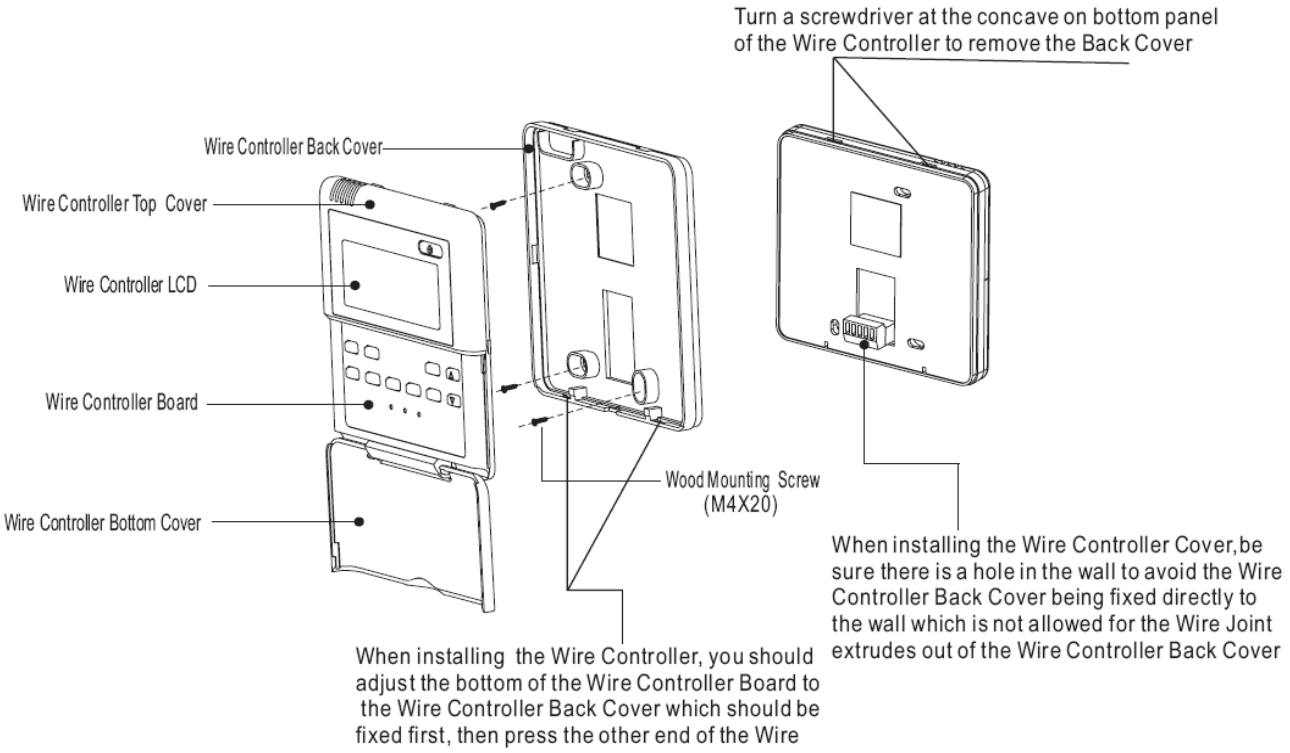
Usually display the set temperature. Press the buttons of and to set temperature, at the mode of FAN, there is no figure display in the area.

Installation



Installation Notice:

When the air conditioner needs the constant frequency wire Controller, be sure adding a Wire Joint with 5 terminal named A, B, C, D, E in indoor unit, and fixing a infrared emitter whose anode and cathode connecting with A and B near the receiver in the Indoor Unit Switch Board, then connecting the terminal +5v, GND, Run in the Switch Board to C,D,E respectively.


Turn a screwdriver at the concave on bottom panel of the Wire Controller to remove the Back Cover
Wire Controller Back Cover
Wire Controller Top Cover
Wire Controller LCD
Wire Controller Board
Wire Controller Bottom Cover
Wood Mounting Screw (M4X20)
When installing the Wire Controller Cover,be sure there is a hole in the wall to avoid the Wire Controller Back Cover being fixed directly to the wall which is not allowed for the Wire Joint extrudes out of the Wire Controller Back Cover
When installing the Wire Controller, you should adjust the bottom of the Wire Controller Board to the Wire Controller Back Cover which should be fixed first, then press the other end of the Wire

NOTE

Never turn screws too tightly, or else the cover would be dented or the Liquid Crystal breaks.

Please leave enough long cable for maintenance of the Wire Controller Board.